III. Environmental Resources and Consequences

US 301 Project Development

Federal Highway Administration

Delaware Department of Transportation

III. ENVIRONMENTAL RESOURCES AND CONSEQUENCES

This chapter details the important features of the project area that are potentially impacted by the implementation of one of the alternatives. The project area, as shown in ***Figure III-1***, includes an approximately one-mile wide corridor surrounding the centerlines of the four retained alternatives in southern New Castle County. The northern boundary generally follows the C&D Canal from just west of US 301 to just east of SR 1. Turning south, the eastern boundary of the project area parallels SR 1 to Boyds Corner before turning west to parallel SR 896, and then traversing south through Middletown. The southern limit of the study area includes US 301 in Warwick, Maryland. The western boundary of the project area parallels Choptank Road and Bethel Church Road to the C&D Canal.

In addition to the project area described above, some data were developed using a larger portion of southern New Castle County in order to simplify data collection and present a regional picture of the area in which the project is being proposed. The larger project area is the Middletown-Odessa-Townsend (M-O-T) Planning District of New Castle County (refer to ***Figure III-2***).

A more detailed discussion of the resources, impacts and consequences (minimization and potential mitigation) of the project is presented in the technical reports that are listed in the appendix and incorporated herein by reference.

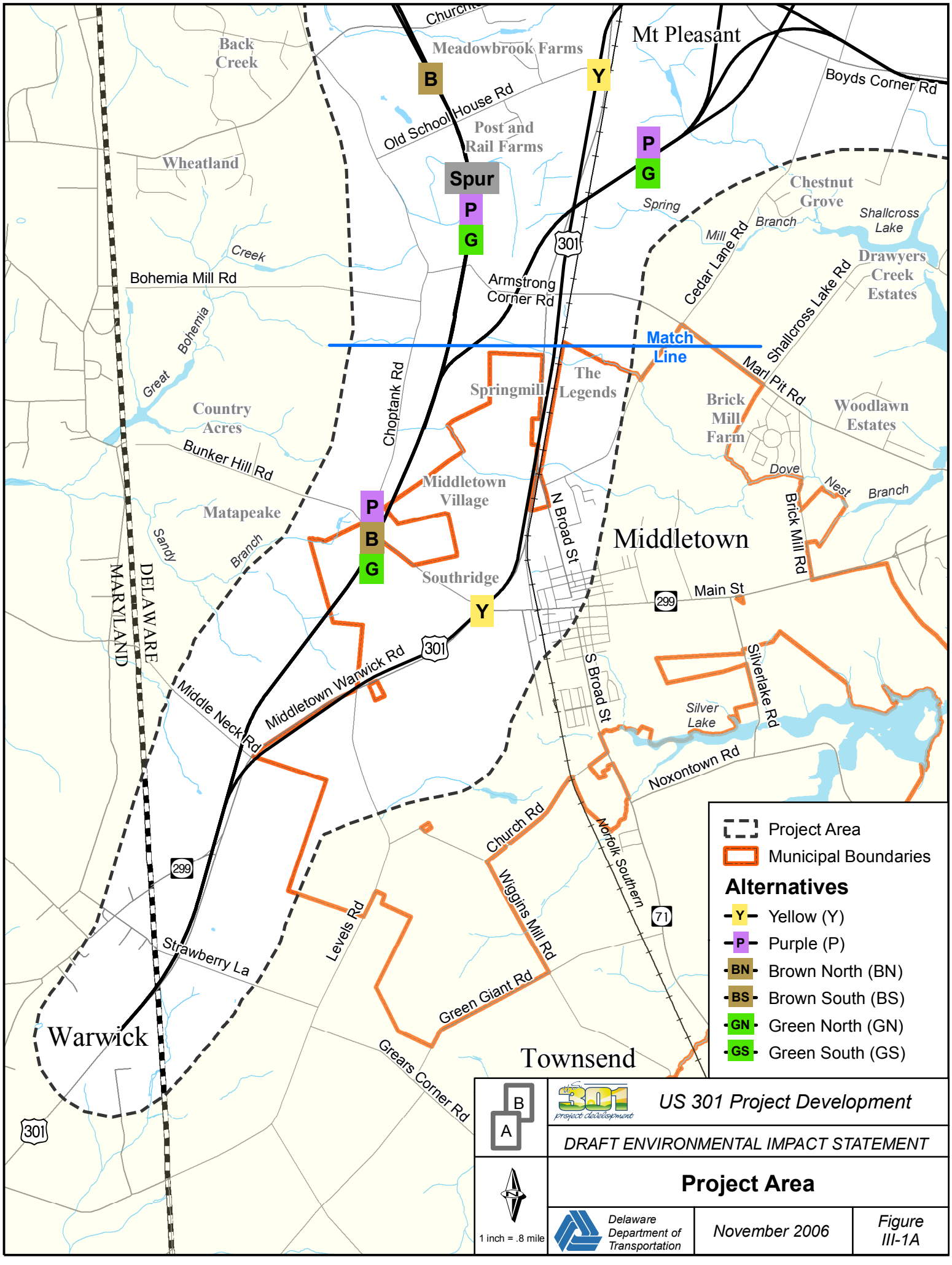
In this chapter, Section A presents the socioeconomic environment, including: land use; population, housing, employment, and transportation; communities and community facilities; potential environmental justice issues; and visual and aesthetic conditions. Section A uses the larger M-O-T Planning District for most data collection.

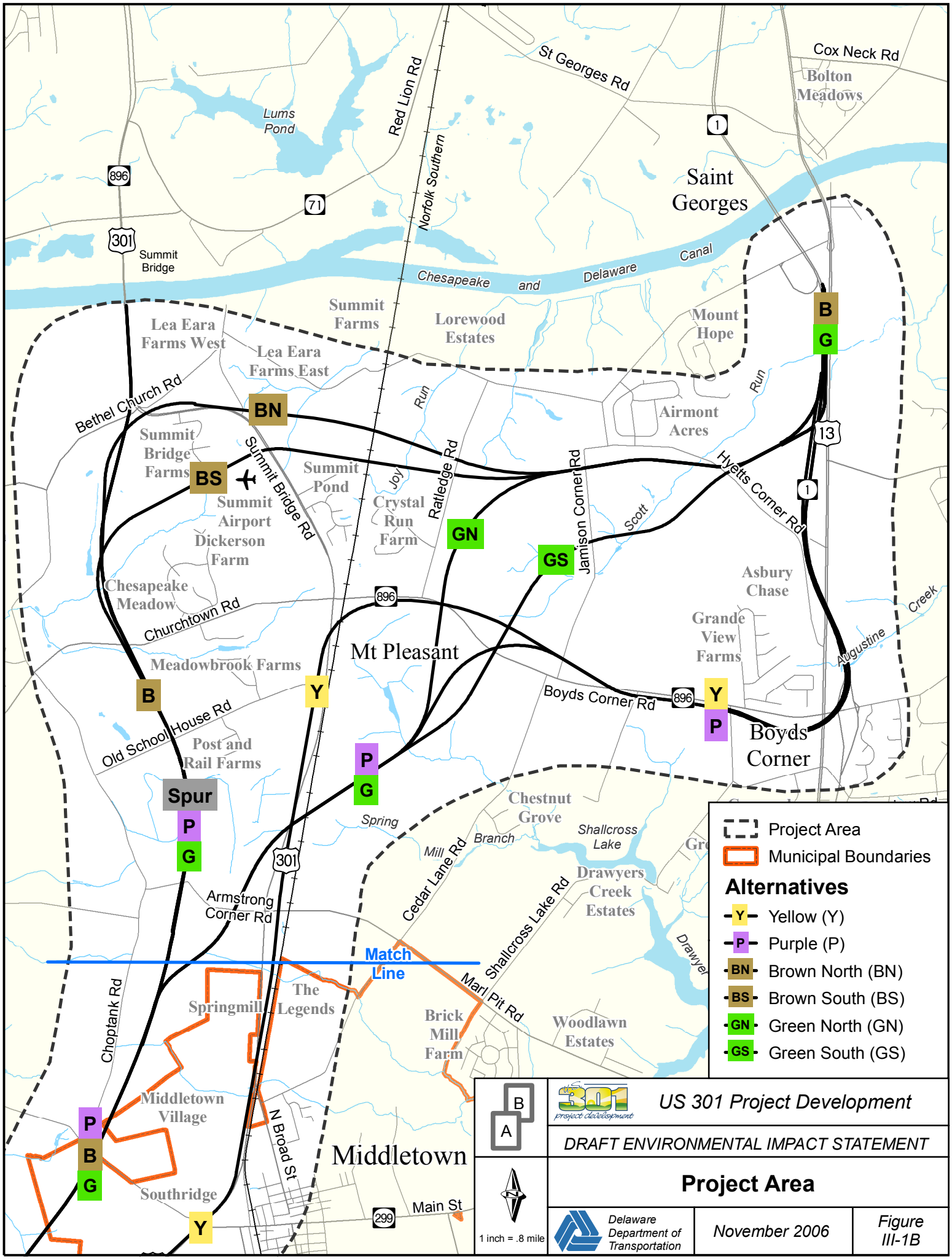
In Section B, the historic and cultural fabric of the project area is presented with a list of known historic and archaeological sites, potential effects, and minimization and proposed mitigation for unavoidable adverse impacts.

Section C presents a discussion of air quality and potential impacts of the project. Section D discusses noise sensitive receptors in the project area, potential noise impacts of the project and potential noise abatement. Section E presents an overview of hazardous materials sites in the project area that may be affected by or affect the implementation of a build alternative.

Section F presents a summary of natural environmental resources, including: topography, geology and soils;; groundwater; surface water and water quality; floodplains; waters of the United States, including wetlands; vegetation and wildlife; rare, threatened and endangered species; coastal zone management areas; and unique and sensitive areas.

Traffic, energy and temporary construction impacts of the project are discussed in Sections G, H, and I. A secondary and cumulative effects analysis is presented in Section J. The final sections of this chapter present the relationship between local short-term uses of the human environment and the maintenance of enhancement of long-term productivity (Section K) and the irreversible and irretrievable commitment of resources (Section L).


Mt Pleasant
Meadowbrook Farms
Boyds Corner Rd
Old School House Rd
Post and Rail Farms
Wheatland
Back Creek
Spur
Chestnut Grove
Shallcross Lake
Drawyers Creek Estates
Cedar Lane Rd
Mill Branch
Spring
Creek
Bohemia Mill Rd
Armstrong Corner Rd
301
Shallcross Lake Rd
Match Line
Marl Pit Rd
Bohemia
Great
Country Acres
Springmill
The Legends
Choptank Rd
Brick Mill Farm
Woodlawn Estates
Bunker Hill Rd
Middletown Village
Dove
Nest
Branch
Brick Mill Rd
Matapeake
Sandy
Branch
N Broad St
Middletown
MARYLAND
DELAWARE
Southridge
Main St
299
Middle Neck Rd
Middletown Warwick Rd
S Broad St
Silverlake Rd
Silver Lake
Noxontown Rd
Church Rd
Norfolk Southern
Wiggins Mill Rd
Levels Rd
Strawberry La
Green Giant Rd
71
Warwick
Townsend
Grears Corner Rd
Project Area
Municipal Boundaries
Alternatives
Y Yellow (Y)
P Purple (P)
BN Brown North (BN)
BS Brown South (BS)
GN Green North (GN)
GS Green South (GS)
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Project Area
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-1A


Project Area
Municipal Boundaries
Alternatives
Yellow (Y)
Purple (P)
Brown North (BN)
Brown South (BS)
Green North (GN)
Green South (GS)
Match Line
Saint Georges
Middletown
Mt Pleasant
Boyds Corner
Summit Bridge
Bethel Church Rd
Summit Bridge Rd
Churchtown Rd
Old School House Rd
Armstrong Corner Rd
Choptank Rd
Red Lion Rd
St Georges Rd
Cox Neck Rd
Bolton Meadows
Norfolk Southern
Chesapeake and Delaware Canal
Ratledge Rd
Jamison Corner Rd
Hyetts Corner Rd
Boyds Corner Rd
Cedar Lane Rd
Shallcross Lake Rd
Marl Pit Rd
N Broad St
Main St
Lums Pond
Lea Eara Farms West
Lea Eara Farms East
Summit Farms
Lorewood Estates
Mount Hope
Airmont Acres
Summit Bridge Farms
Summit Airport
Summit Pond
Crystal Run Farm
Dickerson Farm
Chesapeake Meadow
Meadowbrook Farms
Post and Rail Farms
Asbury Chase
Grande View Farms
Chestnut Grove
Shallcross Lake
Drawyers Creek Estates
Springmill
The Legends
Brick Mill Farm
Woodlawn Estates
Middletown Village
Southridge
Spur
BN
BS
GN
GS
B
G
P
Y
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Project Area
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-1B

A. Socioeconomic Environment

This section describes the existing social and economic setting of the project area, shown in ***Figure III-1***. A regional overview of southern New Castle County is presented, followed by descriptions of the three incorporated towns in the area. A discussion of the project's conformity with local and regional plans and with state and county-wide planning documents concludes the regional overview. Resources inventoried and evaluated include land use, population, and housing; communities and community facilities; parks and recreation areas (including greenways); demographics and environmental justice; economic resources; and aesthetics and quality of life issues. The potential impacts of the alternatives on the socioeconomic resources are described along with efforts to avoid, minimize, or mitigate those impacts.

1. Regional Overview

New Castle County, Delaware, is the fastest growing and most developed of Delaware's three counties. The county accounts for 64 percent of Delaware's total population, 64 percent of the state's labor force, 65 percent of the total employment in the state, and 80 percent of the state's total wages (*New Castle County 2002 Comprehensive Development Plan Update*, adopted March 25, 2002).

The county is divided east-west by the Chesapeake and Delaware (C&D) Canal. North of the Canal, growth has been more intense and concentrated in the areas around Newark and Wilmington, spreading to new communities supported by transportation provided by I-95, US 40, and SR 2, as well as public transportation options including commuter rail (Southeast Pennsylvania Transit Authority, or SEPTA) and buses. South of the Canal, growth has historically occurred at a slower rate until recent decades. Since 1990, the area surrounding the Canal has experienced a boom in residential development (both built and planned) because of the availability of land and adopted zoning changes. Between 1970 and 2000, 68,231 new homes were built in New Castle County, with the highest rates of growth in the three planning districts closest to the Canal: Central Pencader and Red Lion to the north and the Middletown-Odessa-Townsend (M-O-T) Planning District south of the Canal. In the M-O-T Planning District (see ***Figure III-2***) alone, 3,324 new homes were constructed in the decade between 1990 and 2000.

a. Middletown-Odessa-Townsend Planning Area

New Castle County's *2002 Comprehensive Development Plan Update* designates the area of New Castle County south of the Canal as the M-O-T Planning District. According to the Wilmington Area Planning Council (WILMAPCO), in the past three decades the population of the M-O-T district has almost tripled, from 10,077 persons in 1970 to 29,682 persons in 2000. The number of households has more than tripled, from 3,101 in 1970 to 9,549 in 2000. This growth is projected to continue to 2025, as shown in ***Table III-1***.

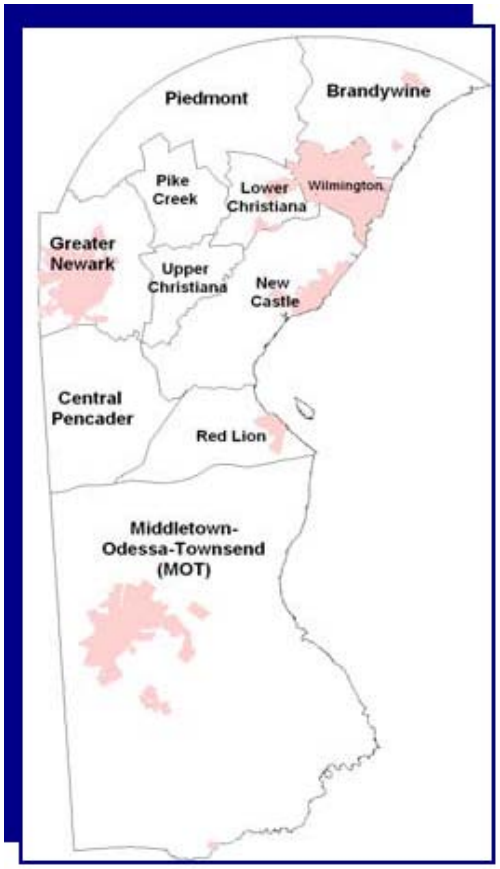


Figure III-2: New Castle County Planning Districts

Table III-1: Total Population and Household Trends in the Middletown-Odessa-Townsend Planning District, 1970 to 2025

MOT	1970	1980	% change	1990	% change	2000	% change	2025	% change
Total Population	10,077	13,120	30.2%	18,634	42.0%	29,682	59.3%	48,214	62.4%
Total Households	3,101	4,454	43.6%	6,225	39.8%	9,549	53.4%	18,627	95.1%

Source: New Castle County 2002 Comprehensive Development Plan Update

The accelerated growth in recent years continues to spur new development in the M-O-T region as a whole. Each of the three incorporated towns (Middletown, Odessa, and Townsend) has seen varying degrees of development. Middletown has been affected most by pressures of new development and has added 1,898 acres through annexation. The Town of Townsend has also undergone significant annexations, which have increased the size of the municipality from 111 acres to 587 acres. Odessa has maintained the town boundaries and seen a reverse trend in development within its incorporated limits, with population and households decreasing over the last 30 years. According to the U.S. Census Bureau there was a population of 547 in 1970 which decreased to 286 in the year 2000.

The M-O-T region has traditionally experienced balanced residential, educational, commercial, and industrial growth; however, in the last fifteen years there has been a shift to extensive residential growth. This growth has been heavily concentrated north of the M-O-T towns,

around the C&D Canal bridge crossings on the St. Georges Bridge (US 13) and the Summit Bridge (US 301). Business, commercial and economic growth in the M-O-T planning area has not been as active as residential growth.

Development patterns and levels of economic growth vary between the three municipalities that are within the M-O-T Planning District, and are assessed below on an individual basis. Each has prepared a town Master Plan, which sets forth goals and objectives for future growth and development.

Middletown

The Town of Middletown is the traditional hub of the farming community that surrounds it. Incorporated in 1861, the town began at the crossroads of Main Street and Broad Street, and after its incorporation, was laid out in a grid pattern around those crossroads. The town grew in importance in the region due to the railroad (currently owned and operated by the Norfolk Southern Railroad), which became the chief conveyance of grain to markets.

In Middletown, the majority of new construction is residential and has taken place in the areas immediately north, east, and west of the town center. Based on past market conditions, build-out of current projects would not be expected to be completed for approximately ten years. Approval and construction of some planned development is currently on hold until proposed additional sewage treatment facilities can be completed in the town of Middletown. The areas of Middletown designated for residential and commercial growth are Westown, Greenlawn, The Legends, Middletown Village, and Cricklewood. Middletown has responded to development pressures by annexing land to the east, west, and south of town to accommodate new growth. Additional acres are planned for annexation in the next few years.

The town has developed a separate Master Plan (a Livable Delaware Growth Plan) for the approximately 2,500 acres of land that was annexed west of SR 71, identified as the Westown growth area. The proposed land use plan for the Westown area includes:

- Residential including single-family, duplexes, and townhouses;
- Commercial including an auto mall, home improvement store, and miscellaneous retail;
- Business including office space, manufacturing, and industrial;
- Park, recreation space, and open space; and
- Educational including a primary school campus and a college campus.

The proposed development will be built in conjunction with roadway improvements that will support traffic generated by the project. The proposed schedule for the roadway improvements is 2005 to 2010.

The *2001 Update to the 1998 Middletown Comprehensive Plan* (March 5, 2001) (*Middletown Comprehensive Plan)* identifies the "Ridge Route" from the US 301 MIS and has preserved the north-south right-of-way in their land use plan for the improvements to US 301. (The Ridge Route is incorporated in the Purple, Brown, and Green Alternatives.) The *Middletown Comprehensive Plan* recommends continued coordination with DelDOT and WILMAPCO in the

decision making process for a US 301/Middletown interchange to allow for integration of land use with the town's transportation network. The US 301 roadway corridor has been identified as the western boundary of development on the 2001 zoning map, and the town has preserved the land within the US 301 corridor for such use. The *Middletown Comprehensive Plan* recommends that US 301 serve as a boundary for office and industrial uses, and transition to preserved agricultural land to the west.

Odessa

The Town of Odessa (area 0.4 square miles) has seen a decline in population and households between 1970 and 2000. The town is bisected north-south by US 13, which divides within the town limits, and SR 299 (Main Street) in an east-west direction. Odessa has a small amount of commercial development, which is located west of and between the northbound and southbound lanes of US 13. According to the *2001 Odessa Comprehensive Plan*, much of the commercially zoned land is either vacant or underutilized. Odessa is an historic community, which aims to strengthen historic design guidelines and zoning ordinance amendments to discourage development plans and also preserve environmentally sensitive areas. The town is impacted by existing vehicular traffic on US 13 (although less so since the completion of SR 1) and SR 299 as vehicles use this roadway through town to access SR 1. Residents are concerned about noise, air quality, and pedestrian mobility issues caused by increased traffic in the area.

Townsend

Townsend is located south of Middletown, west of SR 71, and is bisected by the Norfolk Southern Railroad and Caldwell Corner Road (Main Street). Similar to Odessa, land use in Townsend is predominantly single-family residential. There are a limited number of apartment units. Due to a series of recent annexations there is a large portion of land on the north side of town which is planned for new residential development. The town has a small core of commercial, office, and industrial land uses concentrated around the intersection of the railroad and Main Street, and includes the remaining regional grain elevator and storage/shipping facility in southern New Castle County. Like Odessa, there are limited commercial employers and community service centers scattered throughout the town (the *2003 Townsend Comprehensive Plan*).

b. Transportation Network

In southern New Castle County (the M-O-T Planning District), travel patterns include those related to employment, local travel, and intra-regional travel. Travel patterns and potential impacts of the project on travel patterns are discussed in this chapter in **Section G**.

Roadway Network

The roadway network in southern New Castle County consists of freeway, arterial, collector and local roadways, as shown on ***Figure III-1***. The county is traversed in a north-south direction by four major roadways and the Norfolk Southern Rail line:

- US 301 enters southern New Castle County on the west side at the Delaware/Maryland state line and travels through the west side of the Town of Middletown, parallel to the Norfolk Southern rail alignment. US 301 crosses the C&D Canal on the Summit Bridge.
- US 13 traverses the entire state from the southern border of Delaware and Maryland in Sussex County to the northeastern border of Delaware and Pennsylvania.
- SR 1 is a limited access tolled highway. SR 1 parallels US 13 from south of Dover to I-95. SR 1/US 13 delineates the eastern edge of the project area.
- Outside and to the east of the project area, SR 9 traverses the state along the Delaware River.

There are two major arterial east-west routes in southern New Castle County. SR 299, which enters Delaware from Maryland after passing through the Town of Warwick, passes through Middletown (Main Street) and Odessa as it crosses the county ending at SR 9. Churchtown Road/Boyds Corner Road (SR 896) crosses the county north of Middletown. Both of these roads interchange with SR 1 at the east edge of the project area.

Numerous local roads, including Choptank Road, Marl Pit Road, Cedar Lane Road, Bunker Hill Road and Lorewood Grove Road, cross southern New Castle County, providing a local transportation network for the area's residents. Many of these local roads intersect within the Town of Middletown. SR 71 provides a north-south connection between Middletown and Townsend.

Transit Service

In southern New Castle County, public transportation services are provided by the Delaware Transit Corporation (DTC). DTC, an operating division of the DelDOT, is the statewide provider of public transportation services in Delaware. In southern New Castle County, the existing public transit services are commuter bus service and local shuttle bus.

Bus Routes

Two bus routes service the project area and the Town of Middletown:

- Route 301 – Express commuter bus service along SR 1 between Wilmington and Dover. Route 301 operates weekdays between 5:40 AM and 8:50 PM and operates express only service with stops at the Boyds Corner and Odessa Park and Ride lots.
- Middletown Shuttle – Operates daily providing connections to the Route 301 Express route at the Odessa Park and Ride. The Middletown Shuttle operates local stop service from the Bethesda United Methodist Church Park and Ride along SR 299 to the Odessa Park and Ride.

Transit Facilities

Facilities designed to support public transportation are located within the M-O-T area. These include:

- Boyds Corner Park and Ride is located in the northeast quadrant of SR 1 and Pole Bridge Road. It includes 216 parking spaces and is served by Route 301.
- Odessa Park and Ride is located in the northwest quadrant of SR 1 and DE 299. This facility includes 102 parking spaces and is served by bus Route 301 and the Middletown Shuttle.
- Bethesda United Methodist Church Park and Ride is located near the corner of East Main Street and North Broad Street. It includes 20 parking spaces and is served by the Middletown Shuttle.
- Mid-County Operations and Maintenance Facility was opened in 2004 and is located in the southeast quadrant of US 13 and SR 72. This facility provides dispatch and maintenance of transit vehicle operations in southern New Castle County.

c. Project Conformity with State and Regional Plans

The US 301 Project Development effort is in conformity with the guidelines for development set forth in *Delaware Strategies for State Policies and Spending 5 Year Update July, 2004*, also known as *Livable Delaware*. In that document, guidelines indicate preferred locations, within designated growth areas, of limited access roadways and bypasses, as well as areas where preservation, rather than growth, is the objective of the planning process. During the alternatives development process, these policies for growth areas were reviewed and considered in the planning process.

The *New Castle County 2002 Comprehensive Development Plan Update* discusses regional conformity with WILMAPCO's *Long Range Transportation Plan*, and continued interaction with DelDOT and WILMAPCO to implement *The Greater Route 301 Major Investment Study* and other major roadway projects. The US 301 Project Development effort is consistent with the implementation of that plan.

Neither the *Town of Townsend Comprehensive Plan* (adopted February 2003; revised August 2003) nor the *Town of Odessa Comprehensive Plan 2001* discusses US 301 project. The *Middletown Comprehensive Plan* states that the town has adopted a course of action to preserve land along the ridge route for the new limited access roadway and to preserve a corridor for the upgrade of existing US 301 to a four-lane roadway, should either option be selected. The town recognizes the ridge route as the western boundary for development and recommends that New Castle County limit development west of this route. The Plan also recommended that the town take an active role in the location of a Middletown interchange with the new roadway.

2. Land Use

a. Existing Conditions

According to the Delaware Office of State Planning Coordination, the majority land use in the project area as of 2002 is agricultural (64.2 percent). Residential use and forest lands make up the next largest portions of land in the project area. Urban land uses, including commercial, industrial, institutional, and transportation, are scattered throughout the project area but are primarily concentrated in the towns and along US 301 and the major arterials. The percentages of each land use category are shown in ***Table III-2*** and on ***Figure III-3***.

Table III-2: Existing Land Use in the Project Area

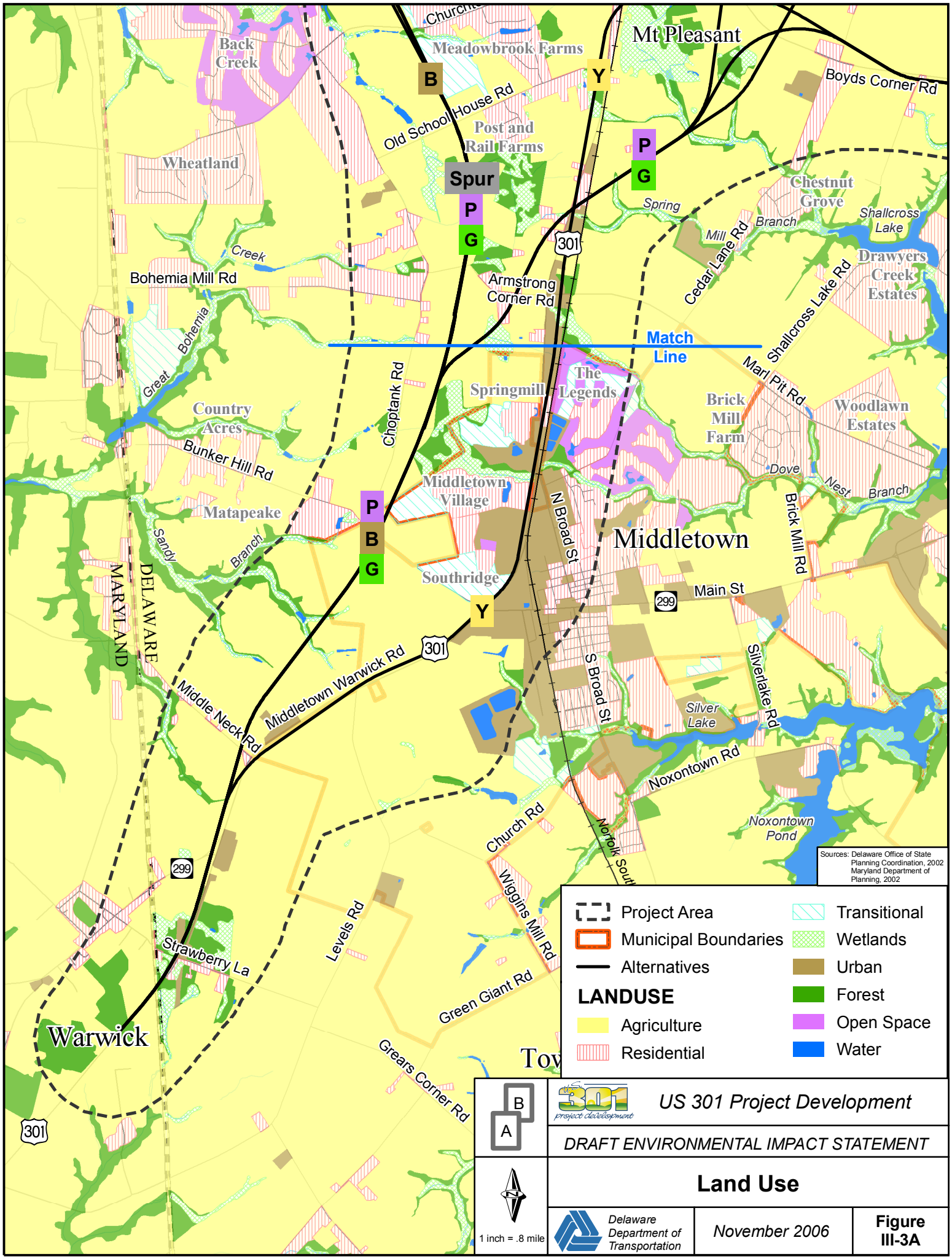
Land Use	M-O-T Planning District		Project Area	
	Area (acres)	Percent	Area (acres)	Percent
Residential	14,149	11.6	2,869	14.6
Agriculture	58,747	48.4	12,578	64.2
Forest	14,192	11.7	1,346	6.9
Recreation/Open Space	442	0.4	143	0.7
Water	3,271	2.7	131	0.7
Wetlands	25,261	20.8	869	4.4
Transitional	1,374	1.1	321	1.6
Urban/Built Up[1]	4,067	3.3	1,334	6.7
Total	**121,503**	**100%**	**19,591**	**100%**

Source: Delaware Office of State Planning Coordination, 2002; Maryland Department of Planning, 2002
Notes: [1]Urban/Built Up includes transportation, commercial, industrial, and institutional.

Although the existing land use in much of the project area is shown as agricultural or forest, much of the area included in these categories is planned and approved for development (see **Section A.3**).

b. Environmental Consequences and Mitigation

There are no direct impacts to land use with the No-Build alternative. Implementation of any of the build alternatives will result in the conversion of acres from present land uses to transportation land use, as shown in ***Table III-3***. Existing land uses that will be converted include urban/built up, residential, agriculture, forest, and wetlands. Impacts to these uses and potential mitigation are discussed separately in other sections of this document, including the SCEA in **Section III.J**.



Sources: Delaware Office of State Planning Coordination, 2002
Maryland Department of Planning, 2002

Project Area
Municipal Boundaries
Alternatives

LANDUSE

Agriculture
Residential
Transitional
Wetlands
Urban
Forest
Open Space
Water

1 inch = .8 mile

US 301 Project Development

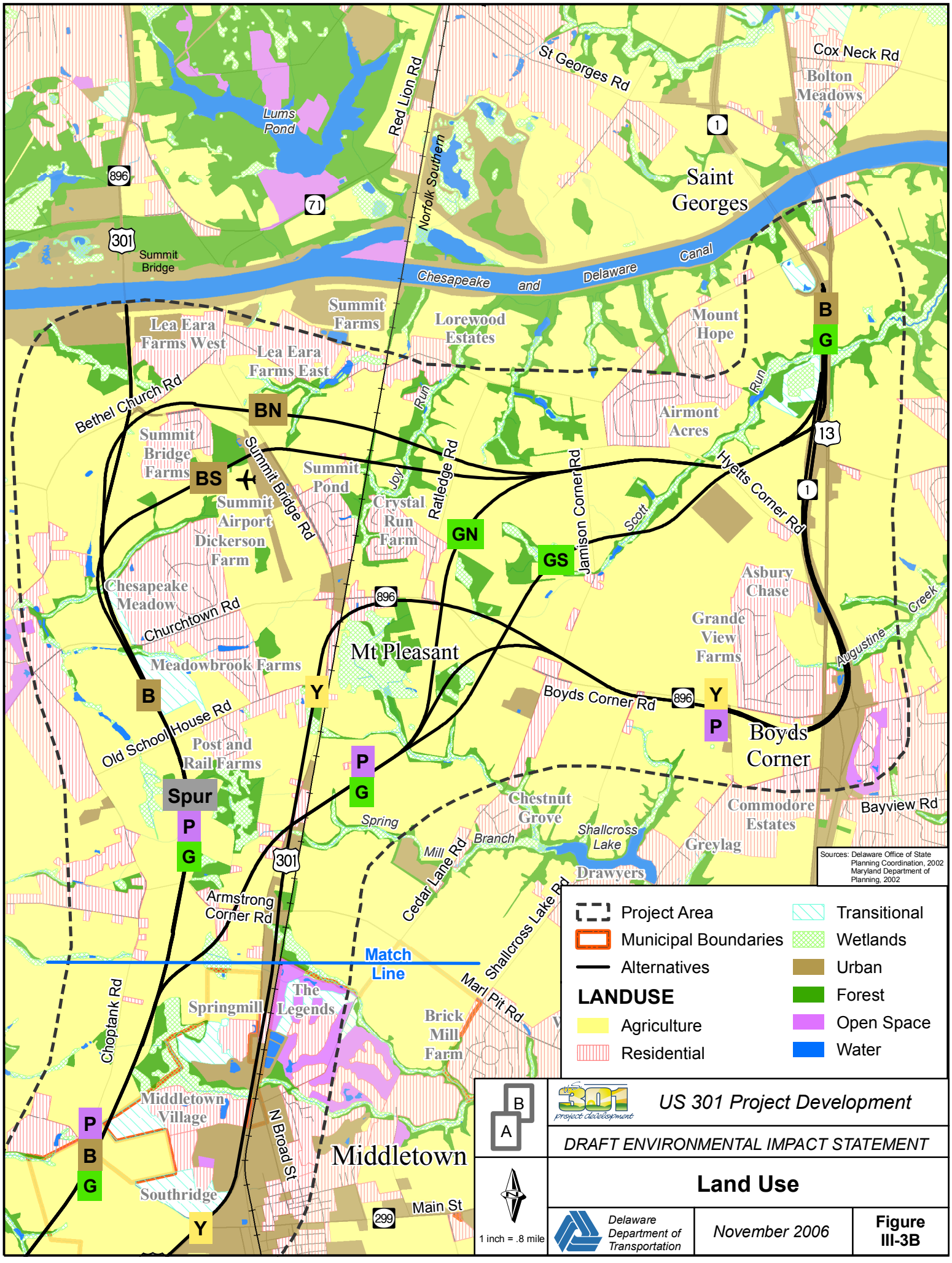
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Land Use

Delaware Department of Transportation

November 2006

Figure III-3A


Lums Pond
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Saint Georges
Norfolk Southern
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Chesapeake and Delaware Canal
Summit Farms
Lorewood Estates
Mount Hope
Lea Eara Farms West
Lea Eara Farms East
Bethel Church Rd
BN
Summit Bridge Farms
BS
Summit Bridge Rd
Summit Pond
Joy Run
Ratledge Rd
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Hyetts Corner Rd
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Chesapeake Meadow
Churchtown Rd
Mt Pleasant
Grande View Farms
Augustine Creek
Meadowbrook Farms
Boyds Corner Rd
Boyds Corner
Old School House Rd
Post and Rail Farms
Spur
Chestnut Grove
Commodore Estates
Bayview Rd
Spring Mill Branch
Shallcross Lake
Greylag
Cedar Lane Rd
Drawyers
Armstrong Corner Rd
Shallcross Lake Rd
Match Line
Marl Pit Rd
Choptank Rd
Springmill
The Legends
Brick Mill Farm
Middletown Village
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Project Area
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Sources: Delaware Office of State Planning Coordination, 2002
Maryland Department of Planning, 2002
1 inch = .8 mile
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Land Use
Delaware Department of Transportation
November 2006
Figure III-3B

Table III-3: Acres to be Converted from Current Uses

2002 Land Use Category	Yellow	Purple	Brown North	Brown South	Green North	Green South
Agricultural	521.1	693.3	766.5	739.9	745.9	721.0
Commercial	66.2	11.1	8.2	8.2	9.1	9.1
Forest	40.1	43.0	40.7	54.2	37.2	39.4
Industrial	1.8	0.0	0.0	0.0	0.0	0.9
Residential	81.8	42.6	11.5	15.9	38.2	38.0
Transportation/Utility/Communication	66.3	64.0	23.4	22.1	22.0	22.0
Transitional	14.9	19.3	26.2	16.7	20.9	20.8
Urban	52.5	4.4	5.4	24.4	4.1	4.1
Water	2.3	0.5	0.1	0.5	0.1	0.1
Wetlands	23.4	23.3	13.4	12.3	19.5	20.1
Total (rounded to nearest whole number)	**870**	**906**	**896**	**894**	**897**	**875**

Source: 2002 Land Use – Delaware Office of State Planning Coordination
Notes: Wetland impacts are from 2002 LU and field delineations.
Overall LOD acres also include a portion in Maryland.
Alternatives are as shown in Appendix A and include the preferred options.

3. Planned Development

a. Existing Conditions

There is a large amount of development, approved, pending or under construction, within the M-O-T Planning District. Planned development is shown on ***Figure III-4***. Planned development for unincorporated areas of southern New Castle County is listed in ***Table III-4.***

Table III-4:
Planned Development in the Project Area[1]
within Unincorporated Areas of New Castle County

RESIDENTIAL DEVELOPMENT				
Development Name	**Type**	**Acres**	**# of Units**	**Status[2]**
Cantwell Ridge	Residential	129.6	187	Approved
Bohemia Mill Pond	Residential	123.7	50	Approved
Back Creek II	Residential	181.2	76	Approved
Spring Creek	Residential	112.6	142	Approved
Lorewood Estates	Residential	21.4	10	Approved
Bishops Walk	Residential	39.1	42	Approved
Robinson Run North	Residential	63.8	68	Approved
Shannon Cove	Residential	518.5	410	Approved
Sugar Loaf Farms	Residential	32.9	28	Approved
Goldsborough Farm	Residential	65.1	81	Approved
Odessa National	Residential	614.7	761	Approved
Stonefield	Residential	145.5	186	Approved
Enclave at Odessa	Residential	157.8	205	Approved
Pleasanton	Residential	208	255	Pending
Hyetts Corner	Residential	150.1	143	Pending
Bayberry Town Center	Residential	234.6	539	Expired
Penfield/Lester Property	Residential	113.6	140	Pending

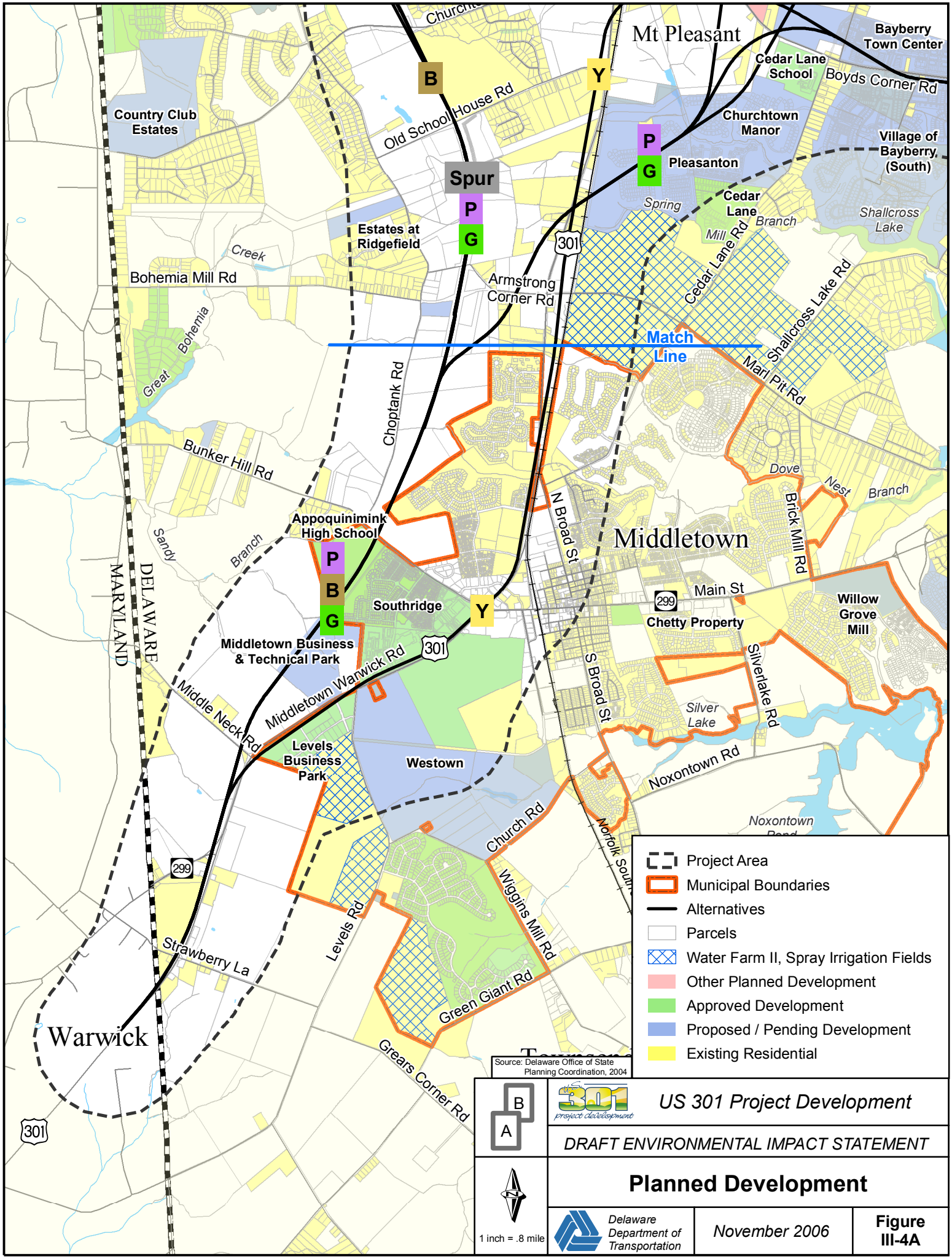
Table III-4:
Planned Development in the Project Area[1]
within Unincorporated Areas of New Castle County

RESIDENTIAL DEVELOPMENT				
Development Name	**Type**	**Acres**	**# of Units**	**Status[2]**
Asbury Chase II	Residential	59.3	47	Pending
Baymont Farms	Residential	220.3	154	Pending
Bayberry North	Residential	463.0	768	Pending
Carter Farm	Residential	407.2	413	Pending
Bayberry South	Residential	835.7	1,186	Pending
Churchtown Manor	Residential	199.8	209	Pending
Rothwell Village	Residential	141.8	150	Pending
Cedar Lane	Residential	87.3	81	Pending
Country Club Estates	Residential	245.9	115	Pending
Crossland	Residential	139.4	165	Pending
Biggs Farm	Residential	30.3	20	Pending
Country Acres II	Residential	10.6	6	Pending
Fairways at Odessa National	Residential	67.8	70	Pending
Estates at Ridgefield	Residential	34.3	16	Pending
Spring Oaks	Residential	98.2	121	Pending
Robinson Crossing	Residential	122.9	71	Pending
Winchelsea	Residential	222.3	413	Expired[3]
Woodgriff Farms	Residential	4.4	4	Expired[3]
NON-RESIDENTIAL DEVELOPMENT				
Development Name	**Type**	**Acres**	**# of Units**	**Status[2]**
Cedar Lane Middle School	School	64.8	--	Approved
St Georges Technical High School	School	110.3	--	Approved
Scott Run Business Park	Light Industrial	230.9	1.7 M sq ft	Approved
Bayview Crossing	Commercial	9.98	--	Approved
Total, Approved & Pending		**6,511**	**6,660**	

Source: New Castle County Department of Planning and Zoning

1. *Does not include development within the town limits of Middletown, Odessa and Townsend. See **Table III-6**.*
2. *Status as of May 2005. Approved development may be under construction.*
3. *Not included in total.*

As shown in ***Table III-4***, there are a total of 6,660 new dwelling units planned or under construction in the unincorporated portion of southern New Castle County, as well as two schools, an industrial park, and a small commercial area. Additional residential development is planned, built or under construction within the incorporated town limits of Middletown (including Westown) and Townsend, as listed on ***Table III-5*** and shown on ***Figure III-4***. There are no major developments occurring in the Town of Odessa. When added together, the total number of new dwelling units in the project area (constructed since the 2000 Census, under construction, and approved) is 15,793.


Mt Pleasant
Bayberry Town Center
Cedar Lane School
Boyds Corner Rd
Churchtown Manor
Village of Bayberry (South)
Country Club Estates
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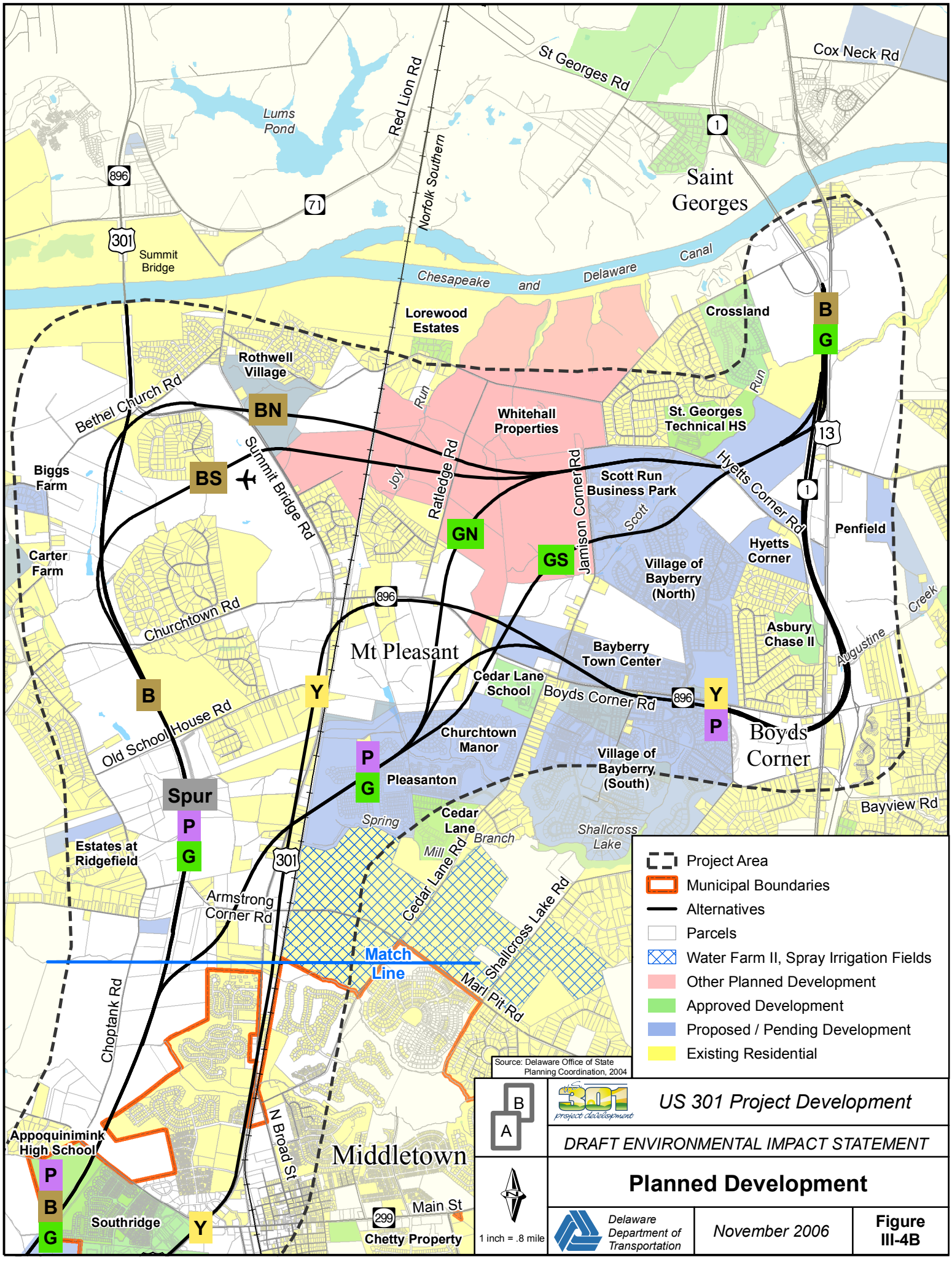
Appoquinimink High School
Sandy
Branch
MARYLAND
DELAWARE
Main St
299
Chetty Property
Willow Grove Mill
Southridge
Middletown Business & Technical Park
Middletown Warwick Rd
Middle Neck Rd
S Broad St
Silverlake Rd
Silver Lake
Levels Business Park
Westown
Noxontown Rd
Noxontown
Church Rd
Norfolk South
Wiggins Mill Rd
Levels Rd
Strawberry La
Green Giant Rd
Grears Corner Rd
Warwick
Project Area
Municipal Boundaries
Alternatives
Parcels
Water Farm II, Spray Irrigation Fields
Other Planned Development
Approved Development
Proposed / Pending Development
Existing Residential
Source: Delaware Office of State Planning Coordination, 2004
1 inch = .8 mile
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Planned Development
Delaware Department of Transportation
November 2006
Figure III-4A


St Georges Rd
Cox Neck Rd
Lums Pond
Red Lion Rd
Norfolk Southern
Saint Georges
Summit Bridge
Chesapeake and Delaware Canal
Lorewood Estates
Crossland
Rothwell Village
Bethel Church Rd
Whitehall Properties
St. Georges Technical HS
Biggs Farm
Summit Bridge Rd
Ratledge Rd
Joy Run
Jamison Corner Rd
Scott Run Business Park
Hyetts Corner Rd
Penfield
Carter Farm
Village of Bayberry (North)
Hyetts Corner
Churchtown Rd
Mt Pleasant
Asbury Chase II
Augustine Creek
Bayberry Town Center
Cedar Lane School
Boyds Corner Rd
Old School House Rd
Churchtown Manor
Boyds Corner
Village of Bayberry (South)
Pleasanton
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Bayview Rd
Spring
Cedar Lane Branch
Mill
Shallcross Lake
Estates at Ridgefield
Armstrong Corner Rd
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Shallcross Lake Rd
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Marl Pit Rd
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Project Area
Municipal Boundaries
Alternatives
Parcels
Water Farm II, Spray Irrigation Fields
Other Planned Development
Approved Development
Proposed / Pending Development
Existing Residential
Source: Delaware Office of State Planning Coordination, 2004
1 inch = .8 mile
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Planned Development
Delaware Department of Transportation
November 2006
Figure III-4B

Table III-5: Planned Residential Development in Middletown and Townsend

Development Name	Total Units	Built	Active Permit	To Be Built	Comments
Middletown					
Estates at St. Anne's	465	0	5	480	Single family homes
Dove Run	298	254	36	8	Single family homes
Lakeside	185	184	0	1	Single family homes
Legends	378	361	15	2	Single family homes
Longmeadow	243	239	0	4	Single family homes
Middletown Crossing	134 100	124 78	1 22	9 0	Single family homes Duplexes
Parkside	492	0	28	464	Single family homes
Springmill	362	336	26	0	Single family homes
Southridge (Arbors) Age restricted 55+ (Westown)	182 12 123	0 0 0	0 0 0	182 12 123	Single family homes Duplexes Triplexes
Southridge (Parkway) (Westown)	7 26 274	0 0 0	0 0 0	7 26 274	Single family homes Duplexes Townhomes
Westown (Levels)	1,000 260 540	0 0 0	0 0 0	1,000 260 540	Single family homes Duplexes Townhomes
Willow Grove Mill	339 248 276	53 86 0	17 30 0	269 132 276	Single family homes Townhomes Condominiums
Highlands	172 611 220	0 0 0	0 0 0	172 611 220	Duplexes Townhomes Apartments
Caribou Lane	22	0	22	0	Townhomes
Congressional Village (Legends)	96	0	48	48	Condominiums
Middletown Village	262 514 300	215 514 0	6 0 24	41 0 288	Single family homes Townhomes Condominiums
Chetty Builders Main Street Complex (Mixed Use Development)	312	0	0	312	Condominiums 170,000 sf retail 15,000 sf restaurant 10,000 sf day care
Total Dwelling Units	***8,413***	***2,444***	***280***	***5,130***	
Townsend					
Townsend Village I	240 single family homes 11-acre village park				
Townsend Village II (Mixed Use Development)	480 single family homes 25,000 retail				

Source: Rae Teel, Middletown Town Manager's Office; The Hon. David Raughley, Mayor of Townsend; Jim Grant, Treasurer, Town of Odessa.

Note: Includes developments of 10 or more dwellings.

There are also a number of planned non-residential developments approved, permitted, or under construction in the Town of Middletown. These are identified on ***Table III-6***. A Happy Harry's is the only planned commercial development in Townsend, and there is no non-residential development planned in Odessa.

Table III-6: Non-Residential Planned Development in Middletown[1]

Middletown			
Development Type	**Details**	**Total Size**	**Comments/Status**
Office	Cricklewood Grove Office Park Cricklewood Grove Medical Office Greenlawn Office Park Middletown Corporate Center	25,000 sf 9,900 sf 141,704 sf 126,300 sf	-- -- -- 126,300 sf proposed; 13,500 under construction
Retail/Commercial	Cricklewood Grove Office Park Market Place Shopping Center Middletown Commons Middletown Crossing Middletown Square Shopping Ctr Middletown Village Shopping Ctr Willow Grove Mill Pederson Property	15,000 sf 160,000 sf 221,141 sf 310,000 sf -- 155,608 sf 460,000 sf 203,313 sf	-- 71,708 sf completed; 18,524 proposed 62,140 sf completed; 164,797 proposed Remaining 50,900 sf under construction 69,019 sf remain 25,989 sf completed Proposed WaWa with gas pumps Retail/office and restaurant (19,500 sf)
Storage Units	Delaware Industries Sentinel Self Storage	5-1,200 sf units --	Built or under construction 81,525 sf completed
Industrial	Middletown Industrial Park	@ 275 acres	

Middletown – Westown		
Development Type	**Property/Development**	**Comments/Status**
Education	Elementary, Middle & High Schools, Day Care	Appoquinimink High School (210,000 sf; under construction); to accommodate @ 2,850 students
	Future 4-Year College	Project 500 students by 2011; currently an agricultural preserve
Manufacturing; industrial	Levels Business Park	700,000 sf on 100 acres; 99,097 sf proposed (5 sites); 27,360 sf under construction
Manufacturing	Bunker Hill Center I Bunker Hill Center II	42,760 sf completed; 20,721 sf under construction; 21,699 sf proposed 191,138 sf completed or under construction
Industrial	Auto Mall Kohl Industrial Center	Auto Mall 54 acres Walmart/Retail/Office – 78 acres; Office Park – 20 acres
Retail	Southridge Retail Center Auto Mall Facility Cochran Farm Property Westown Ramunno Property Middletown Commons	1,528,100 sf total 1,198,000 sf approved including Westown Town Center
Commercial	Bunker Hill Center Kohl Commercial Property Cochran Farm Property	11,400 sf restaurant space 621 hotel rooms 210,000 sf Auto Mall
Office	Various locations	550,000 sf total 280,000 sf approved
Public Facilities	Town Park Future Recreation Area Golf Course	100 acres; Town Park in design 100 acres; sports fields (currently in agricultural preservation, TDR in process

Sources: Rae Teel, Middletown Town Manager's Office; Westown - www.westownproject.com
Notes: [1]Does not include non-residential mixed-use development shown on Table III-3(Chetty Builders and Townsend Village II)
sf = square feet

b. Environmental Consequences and Mitigation

There will be no impacts to planned development with the No-Build Alternative. Completion of any of the build alternatives will directly impact some planned developments in the project area. There are three major multi-use planned developments in the project area that could be affected by the US 301 project: Westown, Bayberry, and Scott Run Industrial Park. Westown will be

impacted by construction of the Yellow Alternative and minimally impacted by the construction of the Green, Purple, and Brown Alternatives. The development plans for Bayberry will be impacted by construction of the Yellow, Purple or Green Alternatives. Scott Run Industrial Park would be affected by construction of the Green or Brown Alternatives.

DelDOT will consult with the owners/developers of these and other affected planned development areas to provide appropriate compensation for property acquisitions. Further information on property acquisitions is found in **Section 5** of this chapter.

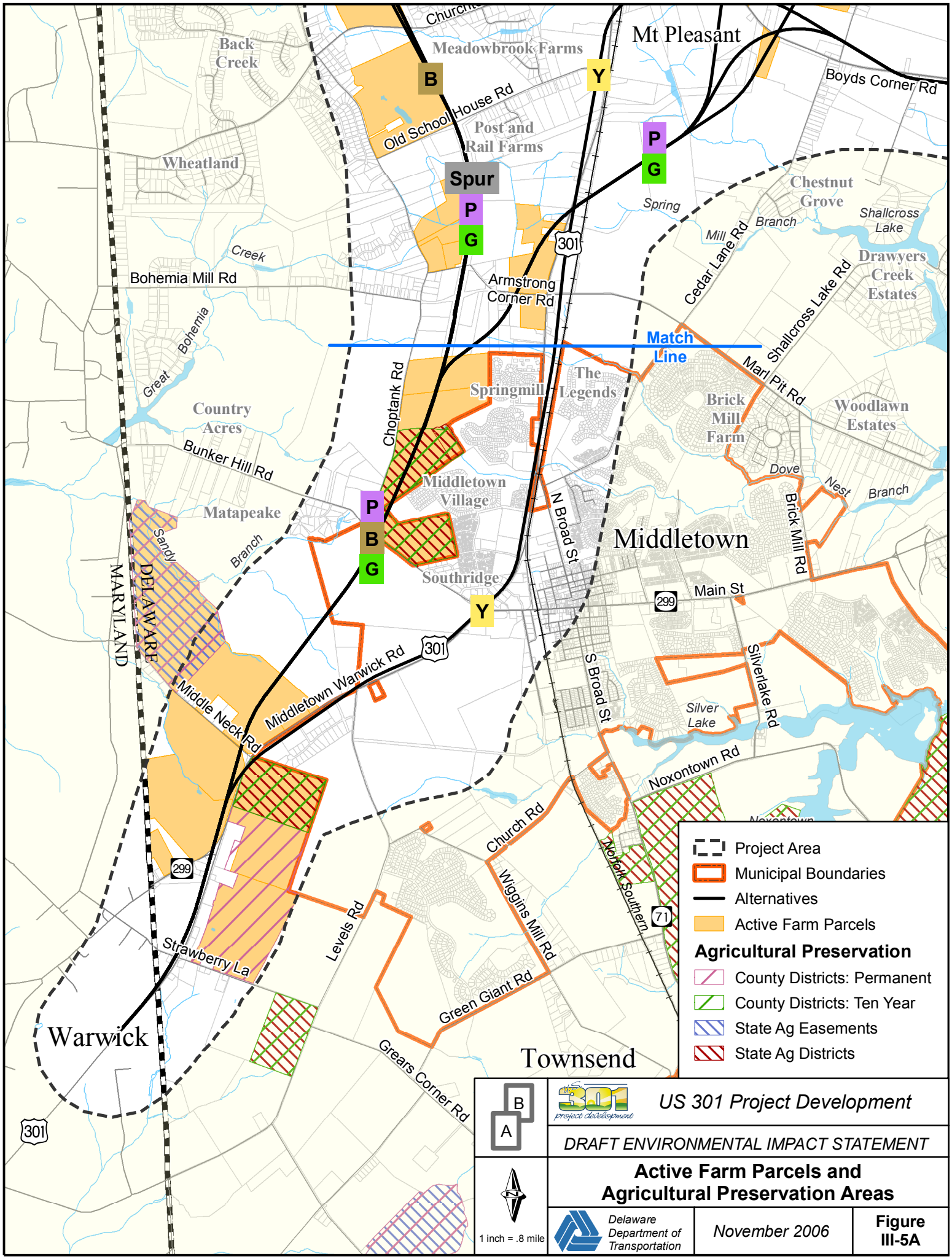
4. Farms and Farmland

a. Existing Conditions

Despite rapid residential growth in southern New Castle County, 48.4 percent of land use remains agricultural. Within the project area, 64.2 percent of the land use is designated agricultural (DE Office of State Planning, 2002 Land Use) although much of that land is planned or approved for development (***Tables III-4, III-5*** and ***III-6***). According to the USDA 2002 Census of Agriculture (National Agricultural Statistics Service; www.nass.usda.gov), approximately 26 percent of New Castle County was farmed, representing a 25 percent decrease compared to 1987 farm use.

Active farms make up a significant portion of the proposed right of way for the alternatives, and most of the project area consists of prime farmland soils (***Table III-8***). Currently, active farmland in the project area is located primarily north and west of Middletown between existing US 301, the C&D Canal and the state line. Many of these farms are located off of Choptank and Bohemia Mill Roads. Additional active farms are located adjacent to the project area to the south. ***Figure III-5*** shows the land use areas designated as agricultural, active farmlands, and agricultural preservation areas in the project area.

Five farming areas are designated as agricultural districts or permanent agricultural easements. Districts provide a temporary agreement between the owner and state or county to continue using the land for agriculture for a 10-year period (renewable), while agricultural easements are farms that are permanently dedicated to farming. This dedication is recorded as a deed covenant and is carried forward to all future owners.


Mt Pleasant
Meadowbrook Farms
Back Creek
Boyds Corner Rd
Old School House Rd
Post and Rail Farms
Wheatland
Spur
Chestnut Grove
Spring
Shallcross Lake
Mill Branch
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Creek
Bohemia Mill Rd
Armstrong Corner Rd
301
Match Line
Marl Pit Rd
Bohemia
Great
Country Acres
Springmill
The Legends
Choptank Rd
Brick Mill Farm
Woodlawn Estates
Bunker Hill Rd
Middletown Village
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S Broad St
Silver Lake
Silverlake Rd
Noxontown Rd
Church Rd
Norfolk Southern
Wiggins Mill Rd
71
Levels Rd
Strawberry La
Green Giant Rd
Warwick
Townsend
Grears Corner Rd
301
Project Area
Municipal Boundaries
Alternatives
Active Farm Parcels
Agricultural Preservation
County Districts: Permanent
County Districts: Ten Year
State Ag Easements
State Ag Districts
B
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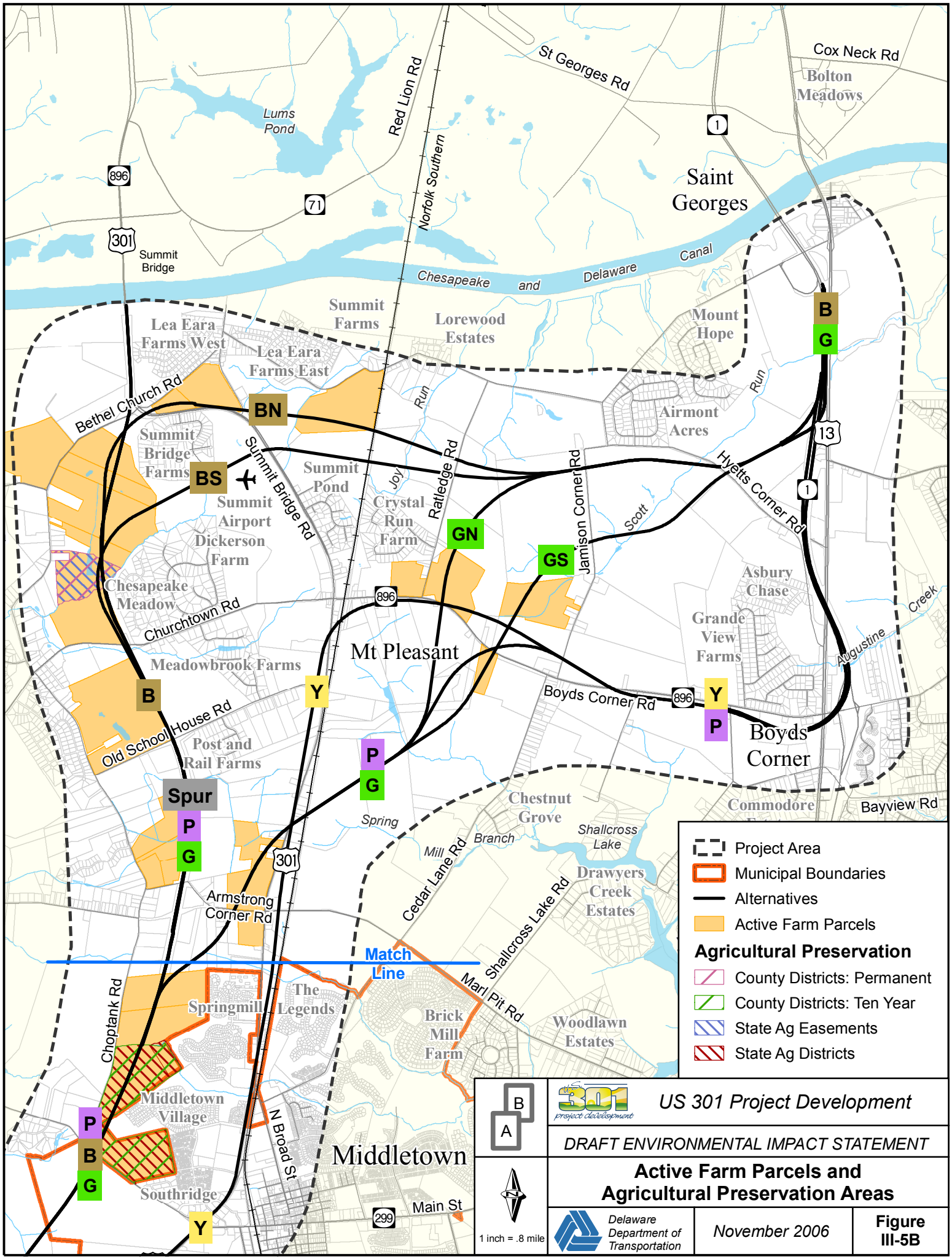
1 inch = .8 mile
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Active Farm Parcels and Agricultural Preservation Areas
Delaware Department of Transportation
November 2006
Figure III-5A


Project Area
Municipal Boundaries
Alternatives
Active Farm Parcels
Agricultural Preservation
County Districts: Permanent
County Districts: Ten Year
State Ag Easements
State Ag Districts
Match Line
Saint Georges
Middletown
Mt Pleasant
Boyds Corner
Summit Bridge
Summit Farms
Lea Eara Farms West
Lea Eara Farms East
Lorewood Estates
Mount Hope
Bolton Meadows
Airmont Acres
Summit Bridge Farms
Summit Airport
Summit Pond
Crystal Run Farm
Dickerson Farm
Chesapeake Meadow
Meadowbrook Farms
Post and Rail Farms
Asbury Chase
Grande View Farms
Chestnut Grove
Commodore
Shallcross Lake
Drawyers Creek Estates
Springmill
The Legends
Brick Mill Farm
Woodlawn Estates
Middletown Village
Southridge
Lums Pond
Chesapeake and Delaware Canal
Red Lion Rd
Norfolk Southern
St Georges Rd
Cox Neck Rd
Bethel Church Rd
Summit Bridge Rd
Ratledge Rd
Jamison Corner Rd
Hyetts Corner Rd
Churchtown Rd
Old School House Rd
Boyds Corner Rd
Bayview Rd
Armstrong Corner Rd
Cedar Lane Rd
Shallcross Lake Rd
Marl Pit Rd
Choptank Rd
N Broad St
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Spring Mill Branch
Joy Run
Scott Run
Augustine Creek
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US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Active Farm Parcels and Agricultural Preservation Areas
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-5B

Farms within the project area include dairy and equine operations and crop production (mainly corn, wheat, barley and soybeans) (USDA 2002 Census of Agriculture). Field surveys were conducted during June 2006 to identify active (with crops or livestock visible) farmlands within the limit of disturbance of the alternatives. Farmlands that appeared to have transitioned into non-agricultural uses were not included in the survey, nor were farm parcels already approved for development. Twenty-seven active farm parcels were identified within or adjacent to the project area during the field survey.

There are businesses within the project area that are vital to or support agriculture. South of Middletown, Beste Veterinary, Hoober, Inc. (Case Tractor), and Money's Farm Market are located along existing US 301. North of Middletown, Logullo's Country Market, M L Whiteman & Sons Landscape Contractors, Ciamaricone's Landscaping, and Mr. Mulch are located adjacent to existing US 301. In addition to those businesses located adjacent to major roadways within the project area, the Peavey Agricultural Products processing plant and grain storage/shipping facility is located in Townsend and serves the needs of many of the local farmers in both Delaware and Maryland.

b. Environmental Consequences and Mitigation

Farm parcels were evaluated using the Land Evaluation Site Assessment (LESA) model, a state and federally approved land analysis system that rates agricultural parcels for suitability for long-term agricultural use. A higher LESA score indicates high agricultural suitability. The 300-point rating system is based on a Land Evaluation (LE) factor (determined by using a land use dependent soil productivity index) and a Site Assessment (SA) factor (derived from non-soil factors, many of which are non-agricultural).

For each alternative, the specific parcels impacted by the alternative were quantitatively assessed by multiplying the LESA score by the amount of land within the parcel that is impacted, thus providing an acre-weighted total score for the specific portion of land impacted. The acre-weighted total scores for each of the affected parcels were then added and divided by the number of acres impacted by the alternative. The result is an acre-weighted score for each alternative. The results of the LESA evaluation are shown in ***Table III-7***.

Table III-7: LESA Model Scores for Impacted Farm Parcels

Alternative	Yellow	Purple	Brown North Option	Brown South Option	Green North Option	Green South Option
Farm Parcels Impacted[2]	9	16	13	15	15	15
LESA Score[1]	192	203	198	202	210	204
LESA Score[3]	212	218	202	209	218	213

Notes: 1. Indicates total impacted, regardless of existing land use.
2. Includes the total acres of specific parcels impacted by each alternative.
3. Excludes parcels with existing and planned development.

The No-Build Alternative will not impact farms or farmland. The variance in the LESA scores for the alternatives was small (the range of scores is 192 to 210), with the Yellow Alternative having the lowest LESA score (192) and the Green Alternative North Option having the highest

LESA score (210). All of the alternatives will impact farm parcels that are suitable for agriculture based on their LESA score.

The conversion of prime farmland soils to highway use is also evaluated using the Farmland Conversion Impact Rating (FCIR) form. This form compares impacts of the alternatives to prime farmland soils within a mile-wide corridor (1/2-mile from either side of the centerlines of the alternatives alignments). An FCIR form for the Preferred Alternative will be submitted to the Delaware Department of Agriculture (DDA) for review and included in the FEIS. Impacts to prime farmland soils are discussed in detail in Section F of this chapter.

All of the build alternatives will impact active farm parcels and prime farmland soils (***Table III-8***). The Green Alternative South Option will impact the fewest (398) acres of prime farmland soil, and the Green Alternative North Option will impact the most (437 acres). The Yellow Alternative will impact the lowest number of active farmland parcels (9).

Each of the build alternatives will partially impact one or more temporary agricultural easements or permanent agricultural districts (***Table III-8***). The Yellow Alternative impacts 14.1 acres of a temporary agricultural easement that has been approved for development as a part of the Westown project. The Purple, Brown and Green Alternatives will impact 32.6 acres of a large agricultural easement north of Bunker Hill Road. The Brown Alternative will impact 9.4 to 12.4 acres of a permanent agricultural district north of Churchtown Road, while the spur road (Purple and Green Alternatives) would impact 6.0 acres of the same property.

Table III-8: Potential Impacts to Prime Farmland Soils, Active Farms, and Agricultural Preserves

Alternative	Yellow	Purple	Brown North Option	Brown South Option	Green North Option	Green South Option
Prime Farmland Soils Impacted (acres)[1]	203	415	412	424	437	398
Active Farmland Parcels Impacted[2]	9	15	16	13	15	15
Partial Takes	7	5	3	2	4	4
Total Takes	2	10	13	11	11	11
Agricultural (10-yr) Districts Impacted Number (acres)	1 (14.1)	1 (32.6)	1 (32.6)	1 (32.6)	1 (32.6)	1 (32.6)
Agricultural (perm) Easements Impacted Number (acres)	0 (0)	1 (6.0)	1 (9.4)	1 (12.4)	1 (6.0)	1 (6.0)

Notes: [1] *This impact information includes prime farmland soils already impacted or proposed for development.*
[2] *Based on property tax parcels and field survey, not including parcels planned and approved for development. Includes total and partial takes.*

The Yellow Alternative will impact the seven businesses that are related directly or indirectly to agriculture. All of the alternatives will impact the Beste Veterinary property (requiring a partial strip take), and the Yellow alternative would require the relocation of Hoober, Inc. (Case Tractor).

None of the alternatives completely avoid impacts to farms and farmlands. Acquisitions of active farm parcels have been minimized through alignment location and engineering design and will be further minimized, where possible, during final design.

Property owners will be contacted regarding potential acquisitions and be fairly compensated for the required acreage. In some cases (agricultural preservation lands), compensation will be determined based on the "highest and best development use of the property with no consideration given to the restrictions and limitations" of the preservation agreement (Delaware Code Title 3, Chapter 9, Subchapter IV, Section 922). Compensation will also be provided for any farmland that may be unsuitable or inaccessible for farming purposes as a result of the roadway improvements. For those businesses that are subject to relocation, owners will be provided relocation assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended by the Uniform Relocation Act Amendments of 1987 (Refer to **Appendix B**).

5. Population and Housing

a. Existing Conditions

Data were extracted from the US Census Bureau web site to describe population and housing within the project area. The Census tracts in the project area are shown on ***Figure III-6***.

According to the 2000 Census, 18,132 persons live in the four census tracts that include the project area, as shown in ***Table III-9***. Tract 166.01, located between the state line and Summit Bridge Road/US 301/SR 71, has the highest population of the four tracts; tract 168.01, located south of US 301 has the smallest population. The other two tracts, 166.02 and 166.04, are located to the east of Summit Bridge Road/US 301/SR 71. Census tract 166.04 includes most of the area of Middletown east of SR 71 and the Town of Odessa.

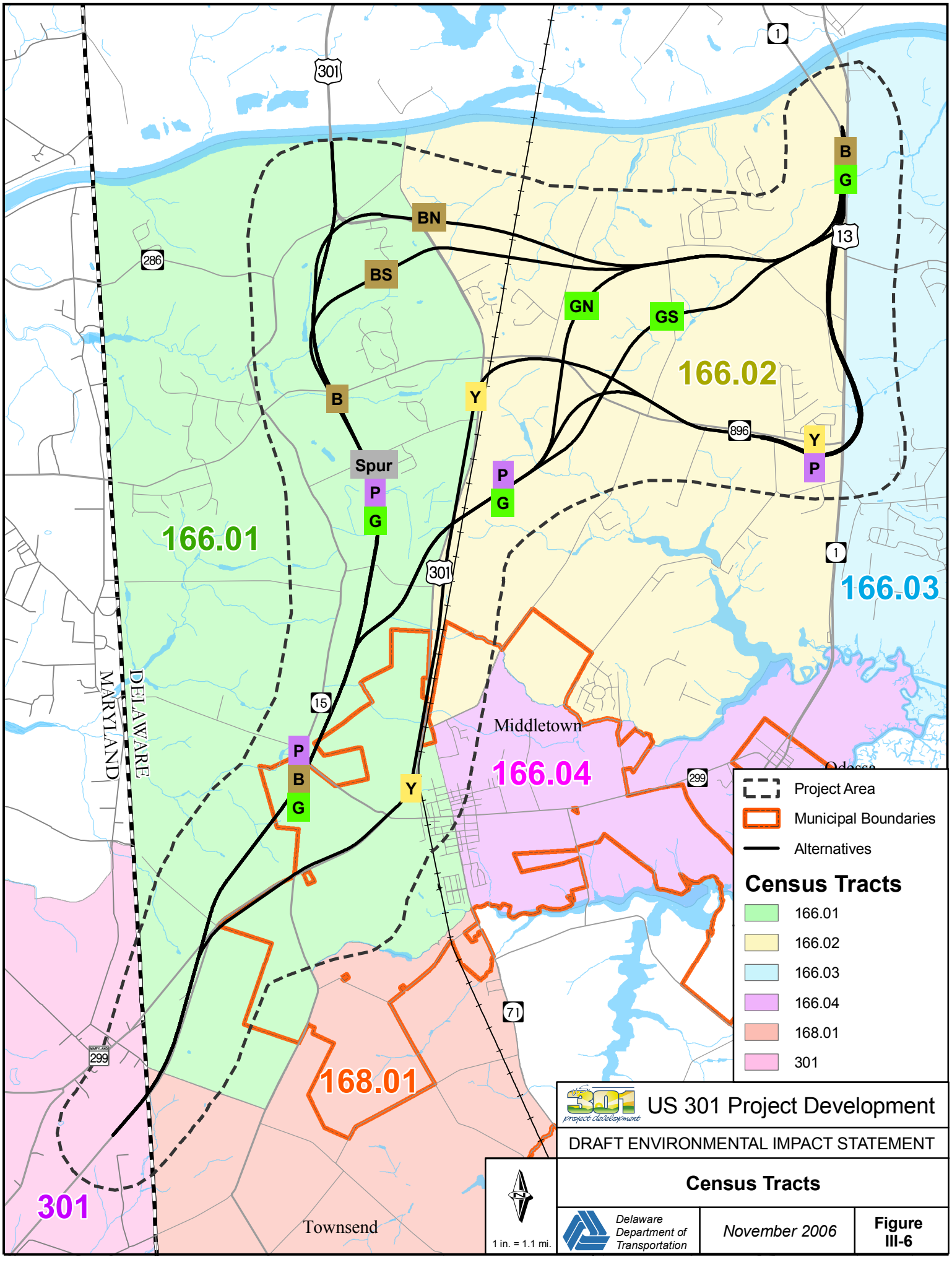
Table III-9: Population and Housing in the Project Area

Geographic Area	Number of Persons	Number of Housing Units	Number of Occupied Housing Units	Average Household Size
166.01	5,712	1,974	1,885	3.03
166.02	4,442	1,402	1,366	3.25
166.04	4,995	1,995	1,842	2.71
168.01	2,983	1,112	1,056	2.82
Project Area Total	**18,132**	**6,483**	**6,149 (95.1%)**	

Source: US Census 2000

There are 6,149 housing units in the project area, and 95 percent are occupied. In census tracts 166.01, 166.02 and 168.01, most of the housing units are detached single family homes. Many of the homes in tracts 166.01 and 166.02 are located in more recently constructed developments.

The population is also identified by age, in order to identify those persons who might be classified as elderly (age 65 and older).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MARYLAND
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Middletown
Townsend
Project Area
Municipal Boundaries
Alternatives
Census Tracts
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166.02
166.03
166.04
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US 301 Project Development
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Census Tracts
1 in. = 1.1 mi.
Delaware Department of Transportation
November 2006
Figure III-6

Table III-10: Population Age Distribution in the Project Area

Geographic Area	Number of Persons	Age Distribution								
		Under 25		25-44		45-64		65 and Older		Median Age
		#	%	#	%	#	%	#	%	
Delaware	783,600	269,915	34.4	236,441	30.2	175,418	22.4	101,726	13.0	36.0
New Castle County	500,265	176,303	35.2	157,485	31.5	108,574	21.7	57,903	11.6	35.0
166.01	5,712	2,183	38.2	2,077	36.4	1,104	19.3	348	6.1	33.5
166.02	4,442	1,702	38.3	1,523	34.3	992	22.3	225	5.1	35.2
166.04	4,995	1,979	39.6	1,646	33.0	973	19.5	397	7.9	31.5
168.01	2,983	990	33.2	922	30.9	755	25.3	316	10.6	37.7
Project Area Total	**18,132**	**6,854**	**33.2**	**6,168**	**29.9**	**3,824**	**18.6**	**1,286**	**6.2**	

Source: US Census 2000
Note: Shaded areas identify tracts with higher than state or county percentages of elderly.

As shown in ***Table III-10***, the highest percentage of elderly persons in the project area, 10.6 percent, are in Census tract 168.01; this tract includes the area mostly south of Middletown. The only concentration of elderly residents identified in the project area was in Springmill, an "active adult" community with an age requirement of 55 and older.

b. Environmental Consequences and Mitigation

Property Impacts and Relocations

There will be no impacts to existing properties from the No-Build Alternative. Each of the build alternatives will impact a number of properties along its alignment, with property impacts ranging from small partial takes to total parcel acquisitions and relocations. The number of properties impacted and the numbers of relocation impacts associated with each of the alternatives is detailed in ***Table III-11***.

The Yellow Alternative would require the greatest number (377) of property acquisitions and the most relocations; there would be 118 residential, 32 business and 11 other relocations with this alternative. The alternatives that follow the ridge route would require less property acquisitions and relocations, with the Brown Alternative Options impacting the fewest properties.

Table III-11: Property Impacts by Alternative

Zoning Classification[1]	Yellow	Purple	Brown North Option	Brown South Option	Green North Option	Green South Option
Residential						
Full	128	7	2	2	4	4
Partial	48	23	18	25	24	24
Relocations	118	7	2	2	3	3
Business[2]						
Full	58	5	4	4	8	7
Partial	50	16	14	14	16	17
Relocations	32	0	0	0	2	4
Other[3]						
Full	21	18	6	6	12	15
Partial	72	85	56	49	68	63
Relocations	11	9	0	2	8	11
Full Takes Total	207	30	12	12	24	26
Partial Takes Total	170	124	88	88	108	104
Total Relocations	161	16	2	4	13	18
Total Affected Properties	**377**	**154**	**100**	**100**	**132**	**130**

Notes:

[1] *Zoning classifications for New Castle County and Town of Middletown; if zoning is not known, property is included in Other category.*

[2] *Business includes General Business, Business Park, Commercial, Industrial, Manufacturing classifications.*

[3] *Other includes Suburban, Suburban Reserve and Open Space classifications.*

Relocation Plan

Each property owner will be contacted regarding the acreage to be acquired. For right-of-way takes where small portions will be acquired, owners will be compensated fairly based on assessment of property value and the size of the acquisition. In addition to just compensation for the assessed property value, those owners whose residences or business properties will be taken will be provided relocation assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended by the Uniform Relocation Act Amendments of 1987 (Refer to **Appendix D**).

A comparison of relocations required (***Table III-11***, above) and the potential stock of housing and business opportunities that will be available within the project area (***Tables III-4, III-5,*** and ***III-6***) shows that a sufficient supply of housing units (single family residence, townhomes and apartments) should be available for occupancy during the estimated time of relocation. While the Yellow Alternative would require the most (118) residential relocations, more than 15,000 new housing units are planned for development. Similarly, the highest number of business relocations (32) would be required with the Yellow Alternative, and there are more than ample opportunities for businesses (industrial, commercial, retail and others) planned within the adjacent project area. A detailed relocation plan for property impacts associated with the project is included in this DEIS as **Appendix D.**

6. Communities and Community Facilities

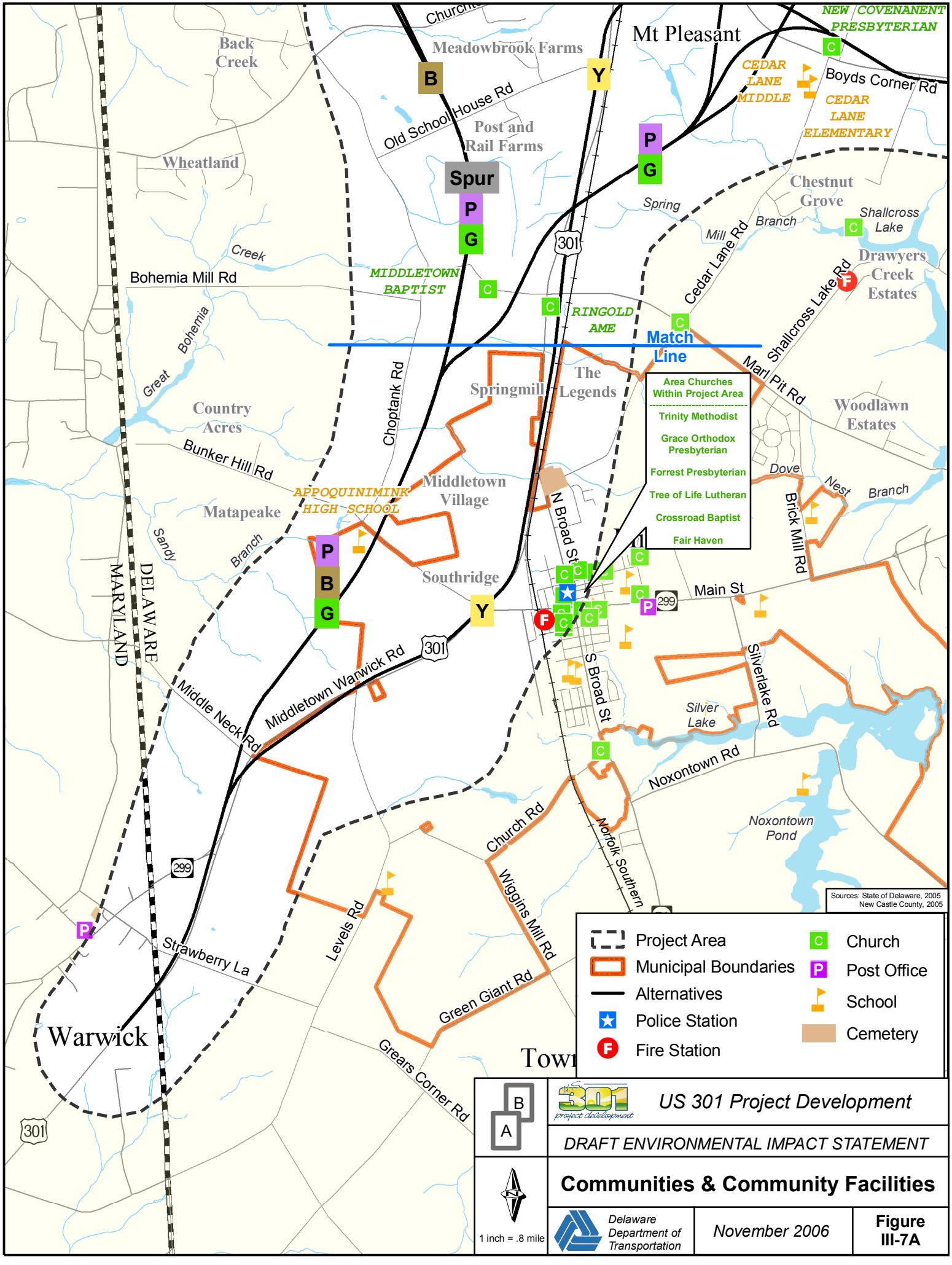
a. Existing Conditions

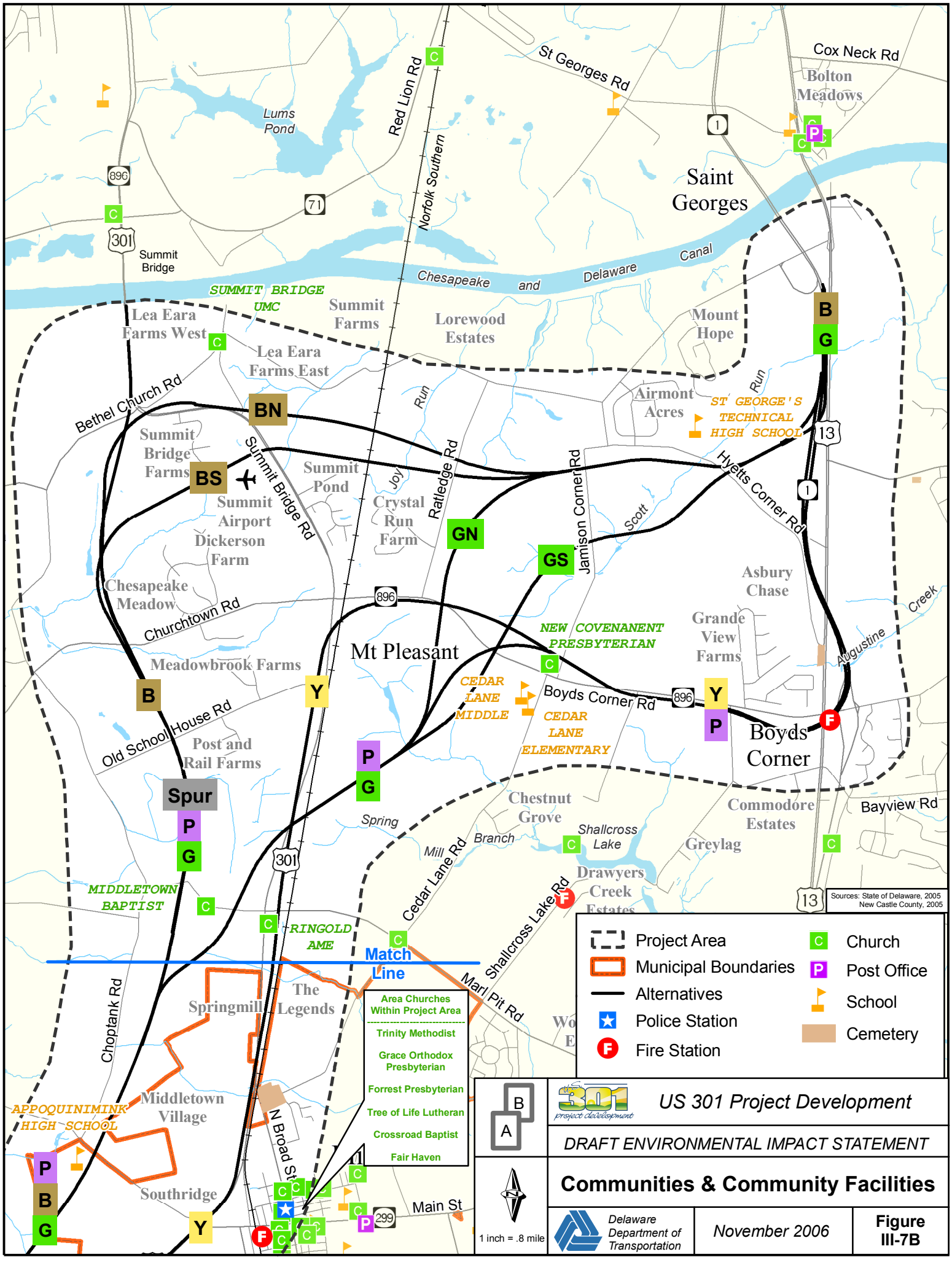
Communities

The existing communities, shown on ***Figure III-7,*** were identified from an inventory of information from the State of Delaware and New Castle County sources. Within the Town of Middletown, communities include Springmill, Middletown Village, The Legends, Bunker Hill Center, Brick Mill Farm, downtown, and Middletown Commons. Both within and outside of Middletown, there are many communities represented by homeowners associations, including

Fox Hunter Crossing	Post and Rail Farms	Summit Farms
Matapeake	Springmill	Midland Farms
Grande View Farms	Mount Hope	Augustine Creek (east of SR 1)
Middletown Village	The Legends	Chesapeake Meadow
Airmont	Dickerson Farms	Crystal Run Farms
Summit Bridge Farms	Summit Pond	Back Creek
Westside Hunt	Lea Eara Farms	Asbury Chase

Most of the communities within and surrounding the project area consist of single family homes or town homes. Many of the community residents are active participants in the project development process, have attended Public Workshops and individual community meetings, and have submitted comments about the proposed alternatives. **Chapter IV** discusses the details of community involvement. ***Table III-12*** provides a profile of the communities in southern New Castle County that are adjacent to or within 1,500 feet of one or more of the alternatives alignments.


Back Creek
Meadowbrook Farms
Mt Pleasant
NEW COVENANENT PRESBYTERIAN
CEDAR LANE MIDDLE
Boyds Corner Rd
CEDAR LANE ELEMENTARY
Old School House Rd
Post and Rail Farms
Wheatland
Spur
Chestnut Grove
Spring
Mill Branch
Shallcross Lake
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Creek
Bohemia Mill Rd
MIDDLETOWN BAPTIST
RINGOLD AME
301
Match Line
Bohemia
Great
Country Acres
Choptank Rd
Springmill
The Legends
Marl Pit Rd
Woodlawn Estates
Bunker Hill Rd
APPOQUINIMINK HIGH SCHOOL
Middletown Village
Matapeake
Dove
Nest
Branch
Brick Mill Rd
Sandy
Branch
N Broad St
Main St
299
MARYLAND
DELAWARE
Southridge
S Broad St
Silverlake Rd
Silver Lake
Middle Neck Rd
Middletown Warwick Rd
301
Noxontown Rd
Noxontown Pond
Church Rd
Norfolk Southern
Wiggins Mill Rd
Levels Rd
Strawberry La
Green Giant Rd
Grears Corner Rd
Warwick
Area Churches Within Project Area
Trinity Methodist
Grace Orthodox Presbyterian
Forrest Presbyterian
Tree of Life Lutheran
Crossroad Baptist
Fair Haven
Sources: State of Delaware, 2005
New Castle County, 2005
Project Area
Municipal Boundaries
Alternatives
Police Station
Fire Station
Church
Post Office
School
Cemetery
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Communities & Community Facilities
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-7A


Saint Georges
Summit Bridge
Chesapeake and Delaware Canal
Lums Pond
Red Lion Rd
Norfolk Southern
St Georges Rd
Cox Neck Rd
Bolton Meadows
Lea Eara Farms West
Lea Eara Farms East
Summit Farms
Lorewood Estates
Mount Hope
Bethel Church Rd
Summit Bridge Farms
Summit Airport
Dickerson Farm
Summit Pond
Crystal Run Farm
Ratledge Rd
Summit Bridge Rd
Airmont Acres
ST GEORGE'S TECHNICAL HIGH SCHOOL
Hyetts Corner Rd
Jamison Corner Rd
Asbury Chase
Grande View Farms
Chesapeake Meadow
Churchtown Rd
Mt Pleasant
NEW COVENANENT PRESBYTERIAN
Meadowbrook Farms
Old School House Rd
Post and Rail Farms
CEDAR LANE MIDDLE
CEDAR LANE ELEMENTARY
Boyds Corner Rd
Boyds Corner
Augustine Creek
Spur
Chestnut Grove
Commodore Estates
Bayview Rd
Shallcross Lake
Greylag
Drawyers Creek Estates
Cedar Lane Rd
Shallcross Lake Rd
Marl Pit Rd
MIDDLETOWN BAPTIST
RINGOLD AME
Match Line
The Legends
Springmill
Choptank Rd
Middletown Village
APPOQUINIMINK HIGH SCHOOL
Southridge
N Broad St
Main St
Area Churches Within Project Area
Trinity Methodist
Grace Orthodox Presbyterian
Forrest Presbyterian
Tree of Life Lutheran
Crossroad Baptist
Fair Haven
Sources: State of Delaware, 2005
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Project Area
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Cemetery
1 inch = .8 mile
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Communities & Community Facilities
Delaware Department of Transportation
November 2006
Figure III-7B

Table III-12: Community Profiles and Alternatives Adjacent

Name	# Units	Type of Units	Within 1,500 feet of Alternative					
			Yellow	Purple	Brown North	Brown South	Green North	Green South
Airmont	117	Single family			X	X	X	
Asbury Chase	77	Single family	X	X				
Grande View Farms	170	Singe Family	X	X				
Summit Farms	148	Singe family			X			
Lea Eara Farms	132	Single family	X		X	X		
Summit Bridge Farms	91	Single family	X	X	X	X	X	X
Dickerson Farm	92	Singe family				X		
Chesapeake Meadow	69	Single family		X	X	X	X	X
Meadowbrook Farms	65	Single family	X					
Post and Rail Farms	34	Single family		X	X	X	X	X
Springmill	363	Singe-family	X	X	X	X	X	X
The Legends	140	Single family	X					
Middletown Village	291 481	Single Family Town houses	X	X	X	X	X	X
Crystal Run Farms	81	Single family				X	X	
Matapeake	27	Single family		X	X	X	X	X
Summit Pond	67	Single family				X		
Midland Farms	@ 20	Single Family		X	X	X	X	X

Community Facilities

Community facilities, also shown on ***Figure III-7***, are located throughout the project area. Community facilities include emergency services (fire, rescue and police), schools, public parks, recreation areas and greenways, churches, cemeteries, libraries, and post offices. Many of the community facilities are identified in ***Table III-13***.

In addition to the existing facilities, several public park areas are planned/approved in conjunction with Westown and other developments (see **Section A.2.a** and ***Tables III-4*** and ***III-5*** in this Chapter), and Delaware Greenways has proposed the Scott Run Greenway Trail and a series of pathways (non-motorized, on-alignment, separated paved paths) to connect the C&D Canal with the public open space along Marl Pit Road (proposed water farm area).

Table III-13: Community Facilities in the Project Area

Emergency Services	Municipal Facilities	Airport
Middletown Police (NCC) Middletown Volunteer Fire Company No. 27 Southern Patrol Unit & Paramedic Company No. 9 Odessa Fire & Rescue Station 4	Middletown Post Office National Guard Armory Middletown Town Hall Delaware Court No. 9 Appoquinimink Public Library	Summit Airport
		Golf Courses
		Back Creek Frog Hollow
Schools	**Churches**	**Day Care Centers**
Appoquinimink High School Silver Lake Elementary School St. Georges Technical High School Middletown High School Cedar Lane Elementary School Redding Middle School Cedar Lane Middle School Everett Meredith Middle School Cedar Lane Early Childhood Center Groves Adult High School St. Andrews School Middletown Charter School St. Annes School Middletown Middle School Brick Mill Elementary School	Summit Bridge Methodist New Covenant Presbyterian Full Gospel Church of Deliverance Union Church Immanuel United Methodist Haven United Methodist Mount Calvary Baptist Trinity Methodist Dales Memorial Methodist St Josephs Catholic Middletown Baptist Grace Orthodox Presbyterian St. Anne's Church St. Anne's Episcopal Bethesda United Methodist Forest Presbyterian	Middletown Charter School Day Care 8 additional Day Care Centers
		Parks & Recreation Areas
		Future Water Farm II Middletown Commons C&D Canal Greenway Trails
		Cemeteries
		Forest Cemetery St Anne's Church Cemetery Asbury Cemetery

b. Environmental Consequences and Mitigation

There will be no direct impacts to communities from the No-Build Alternative. However, inaction will continue to compound congestion and safety concerns on roadways traveled by residents within these communities, affecting travel times and access for residents and businesses.

Affected communities and proposed mitigations are identified on ***Table III-14***. These and other community impacts are discussed below.

The Yellow Alternative would impact the community fabric of Middletown by bisecting the town, affecting local access as well as businesses and residences along existing US 301. All of the build alternatives avoid physical impacts to the remaining communities located throughout the project area, although there may be impacts to individual homes in these communities. Some planned residential developments with approved subdivision plans may also be impacted by one or more of the alternatives. For example, the proposed Bayberry development would be bisected by the Yellow, Purple and Green South Alternatives.

Table III-14: Residential Community Impacts Summary

Community	Potential Impacts and Proposed Mitigation
Airmont	Brown and Green Alternatives right of way would be within 360 to 3,000 feet of the nearest homes and would be 300 feet wide. The roadway elevation would be below to above grade. A visual screening earth berm is proposed along the south side of the community.
Grande View Farms	The Yellow and Purple Alternatives right of way would be within 80 to 320 feet of the nearest homes and would be 200 to 225 feet wide. The roadway elevation would be above grade. An earth berm is not feasible due to proximity and influence of other local roadways.
Lea Eara Farms	All of the build alternatives right of way would be within 0 and 850 feet of the nearest homes and would be at grade, rising to above grade approaching Summit Bridge. Roadway width would be between 220 and 260 feet. An earthen berm is proposed to the south of Lea Eara Farms to screen visual impacts.
Ratledge Road Residences	The Green North Alternative right of way would be between 350 to 400 feet from the nearest homes and would be above grade at existing US 301 descending to grade. An earth berm could provide visual screening to some homes as the roadway approaches grade.
Summit Bridge Farms	All of the build alternatives would require right of way acquisition from properties nearest the alignment, which would be between 0 and 300 feet from the adjacent properties. Alignments would be at grade, rising to above grade approaching Summit Bridge. Roadway width would be between 200 and 600 feet. Visual screening berms are proposed except on the north side of the community (affected by Brown North and Yellow Alternatives), where an earth berm is not feasible due to proximity and influence of other local roadways.
Chesapeake Meadow	The Brown, Purple and Green Alternatives right of way would be within 130 to 160 feet of the nearest properties, and the roadway right of way between 260 and 310 feet wide. The roadway would be above-grade at this location. An earth berm is proposed adjacent to the roadway to mitigate visual impacts.
Springmill	The Yellow Alternative right of way would be 87 feet from the east side of the community, 525 feet wide and above-grade at this location. An earth berm is not feasible due to proximity and the influence of local roadways and the railroad. The Brown, Purple and Green Alternatives right of way would be between 650 and 1500 feet from the northwest corner of the community, between 260 and 550 feet wide and at to above grade in this location. An earthen berm is proposed to visually screen the community from these alternatives.
The Legends West	The Yellow Alternative right of way would be 400 feet from the nearest homes on the west side of this community. The roadway right of way would be 400 to 550 feet wide and above grade in this location. An earth berm is not feasible due to proximity and the influence of local roadways and the railroad.
Middletown Village	The Yellow Alternative right of way would be 500 feet from the nearest residences and 200 to 400 feet wide east of the community and above grade. An earth berm is not feasible in this location due to proximity and the influence of local roadways. ROW The Brown, Purple and Green Alternatives right of way would be between 200 and 2,000 feet from homes on the west side of the community. The roadway would be 250 to 325 feet wide and below to above grade in this location. An earthen berm is proposed to visually screen the community from these alternatives.
Matapeake	The Brown, Purple and Green Alternatives right of way would be between 500 and 1,200 feet from homes on the east side of the community. The roadway would be 330 feet wide and would be below grade in this location. No mitigation is proposed at this location.

Within some communities adjacent to one of the build alternatives, residences adjacent to the alignment may be acquired and the owners relocated. These impacts are on the edges of communities, and, therefore, do not impact the communities as a whole, and the fabric of the community would remain intact. Most of the impacts to communities in the project area will be

associated with noise impacts, visual impacts, and air quality effects caused by the proximity of one of the build alternatives. Air quality is discussed in **Section C**, and noise impacts and potential mitigations are discussed in **Section D**.

There are no impacts to community facilities from the No-Build Alternative. The Purple, Brown and Green Alternatives will require acquisition of a portion of the Appoquinimink High School property, but the acquisition is not anticipated to affect any school activities. Odessa Fire & Rescue Station 4, located at Boyds Corner Road and US 13, may be impacted by the Yellow and Purple Alternatives due to the construction of the US 301 ramps to SR 1, and may require relocation.

There will be no impacts to publicly owned parks and recreation areas from the No-Build Alternative or from the build alternatives. All of the build alternatives have been engineered to utilize avoidance structures such as steeper slopes and retaining walls in order to avoid these resources. All of the build alternatives that cross the proposed Scott Run Greenway and associated connecting pathways will be designed to provide for full connectivity of these paths and trails.

Visual impacts to communities may be minimized by landscaping and grading to provide a buffer screening of natural vegetation. Landscaping would be determined during the final design phase of the project. Earthen berms are proposed in several locations to screen the highway from nearby communities (Southridge, Middletown Village, Springmill, Chesapeake Meadow, Summit Bridge Farms, Lea Eara Farms and Airmont). Potential noise impacts could also be minimized or eliminated by the berms. Potential noise impacts are discussed in detail in Section D.

7. Environmental Justice

Title VI of the Civil Rights Act of 1964 (USC 2000d *et seq.*) and Executive Order 12898 (*Federal Actions to Identify and Address Environmental Justice in Minority and Low Income Populations*, February 11, 1994, commonly referred to as environmental justice), require all federal agencies "…to identify and address as appropriate, disproportionately high and adverse human health or environmental effects … on minority populations and low-income populations". Title VI requires federal agencies to ensure that their programs, policies, and activities do not have the effect of excluding minority or low income populations from the benefits of the project, or subjecting persons or populations to discrimination. Environmental justice considerations require that minority populations and low-income populations are specifically included in public participation and outreach programs.

a. Existing Conditions

Racial distribution in the project area is shown in ***Table III-15***. The percentages of minority populations in the project area are, for most of the Census tracts, less than for the state and county as a whole. Of note is the larger than average percent of Hispanic population in tract 166.04 (4.7 percent) and the larger than average number of black/African American persons in tract 166.04 (23.1 percent). The latter Census tract includes the Town of Middletown east of the

Norfolk Southern Railroad alignment and the Town of Odessa. No concentrations of minority populations, however, were identified in the project area. There is a growing Hispanic community in Middletown Village.

Table III-15: Racial Distribution in the Project Area

Geographic Area	Number of Persons	White		Black or African American		Native American		Asian & Pacific Islander		Other		More than One Race		Hispanic*	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%
Delaware	783,600	584,773	74.6	150,666	19.2	2731	0.3	16,542	2.1	15,855	2.0	13,033	1.7	37,277	4.8
New Castle County	500,265	365,810	73.1	101,167	20.2	979	0.2	13,115	2.6	11,087	2.2	8,107	1.6	26,293	5.3
166.01	5,712	5,116	89.6	426	7.5	4	0.1	60	1.0	45	0.8	62	1.1	161	2.8
166.02	4,442	4,083	91.9	237	5.3	2	0.0	38	0.9	45	1.0	37	0.8	87	2.0
166.04	4,995	3,635	72.8	1,152	23.1	7	0.1	40	0.8	95	1.9	66	1.3	237	4.7
168.01	2,983	2,730	91.5	190	6.4	8	0.3	3	0.1	21	0.7	31	1.0	47	1.6
Project Area Total	***18,132***	***15,564***	***85.8***	***2005***	***11.1***	***21***	***0.1***	***141***	***0.8***	***206***	***1.1***	***196***	***1.1***	***532***	***2.9***

Source: US Census 2000
**Note: Hispanic population can be of any race and is included within the various other race categories.*
Shaded areas identify tracts in the project area with the highest minority populations.

Low-income populations are identified by the number of persons whose income is below the standard poverty level established by the Department of Health and Human Services. In 1999, that level was determined to equal an approximate annual income of $19, 350 for a family of four. The percentage of individuals in the project area and in the state and county determined to be below poverty level is shown in ***Table III-16***.

Table III-16: Low-Income Populations in the Project Area

Geographic Area	Total Population	Individuals Below Poverty Level	Percent Individuals Below Poverty Level
Delaware	783,600	69,901	9.2
New Castle County	500,265	40,710	8.4
166.01	5,712	216	3.8
166.02	4,442	43	1.0
166.04	4,995	567	11.2
168.01	2,983	76	2.5
Project Area Total	***18,132***	***902***	--

Source: US Census 2000
Shaded areas identify tracts in the project area with the largest percentage of low income population.

Although the majority of the project area does not have a high percent of low-income individuals, Census tract 166.04 (which encompasses Middletown) has a higher percent of individuals living below poverty level (11.2 percent) than both the state (9.2 percent) and New Castle County (8.4 percent). Census tract 166.04, as stated above, includes eastern Middletown and Odessa. There are no concentrated areas of low-income populations in the project area.

b. Environmental Consequences and Mitigation

Several individual residences occupied by persons of minority or low-income would be directly impacted (acquisitions and relocations) by the Yellow, Purple, and Green Alternatives. The Middletown Village community would be directly impacted (acquisitions and relocations) by the Yellow Alternative. The Middletown Village community would be indirectly impacted (possible noise impacts) by all of the build alternatives. Coordination with environmental agencies, elected officials, community organizations and associations, including low-income and minority representatives, and the public has been an important part of the process.

Efforts to avoid or minimize these and other property impacts will continue through final design. As shown in ***Tables III-4***, ***III-5*** and ***III-6***, development within the project area is very active, and comparable replacement housing is projected to be available for any displaced person. Unavoidable property acquisitions and relocations of any individuals, families, or businesses will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 and Amendments.

The construction of US 301 as a toll facility may impact the environmental justice populations in the region. The tolling of US 301 may exclude those drivers with low income from using the proposed build alternatives; however, the same non-tolled routes that are available today will still be available in the future with each build alternative.

Although the build alternatives would impact minority and low-income populations, the number of minority and low-income displacements is not disproportionately high compared to the total number of displacements. All impacted persons, regardless of ethnicity or income, will be fairly compensated for property impacts that occur as a result of the implementation of the project and will be assisted in relocation.

8. Economic Resources

a. Existing Conditions

The economy of the project area has undergone a significant change over the most recent decades, from a mostly rural, agrarian-based economy to a more residential, service-oriented economy. Future growth is planned for the project area that includes commercial, office, industrial, and general business opportunities. As the landscape has changed from farmland to developed residential communities, more people living within the project area are employed outside of the area and commute to jobs in Wilmington, Newark, Dover and elsewhere. Residents in the project area are employed in a variety of occupations, as shown in ***Table III-17***.

Table III-17: Occupations of the Employed Population in the Project Area

Geographic Area	Management Professional & Related Occupations	Service Occupations	Sales and Office Occupations	Farming, Fishing & Forestry Occupations	Construction Extraction & Maintenance Occupations	Production, Transportation & Materials Moving Occupations	Total Civilian Employed	Unemployed (% of total population in labor force)
Delaware	132,858	54,912	104,059	1,926	35,950	47,106	376,811	20,549 (5.2%)
New Castle County	97,390	33,430	70,906	662	20,293	26,639	249,320	13,571 (5.2%)
166.01	951	321	922	23	333	365	2,915	33 (1.1%)
166.02	1,118	236	688	0	167	214	2,423	57 (2.3%)
166.04	658	416	701	3	260	482	2,520	141 (5.3%)
168.01	303	168	435	2	283	249	1,440	72 (3.2%)
Total	**3,030**	**1,141**	**2,746**	**28**	**1,043**	**1,310**	**9,298**	**303 (3.0%)**

Source: US Census 2000

Professional occupations lead the numbers of employed in the project area, with sales and office occupations the second highest employment category. The Census data also indicate only 22 persons in the armed forces in the project area. The occupation category in the project area with the fewest employees is agriculture (Farming, Fishing & Forestry), 28 persons total. It is noted that unemployment in the project area (3.0 percent) is below that of the state (5.2 percent) and of New Castle County (5.2 percent).

Residents of the project area are employed in a number of employment sectors, as shown in ***Table III-18***.

Table III-18: Industries Employing those in the Project Area

Geographic Area	Agriculture[1]	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation[2]	Information	F.I.R.E.[3]	Professional[4]	Education[5]	Arts/Entertain[6]	Other	Public Administration
Delaware	4,042	27,866	49,720	10,384	43,578	18,002	7,155	43,787	34,885	73,056	28,979	15,752	19,605
New Castle County	1,231	15,118	32,862	6,634	25,774	11,957	5,106	35,995	27214	49,176	18,076	10,458	9,719
166.01	63	225	532	112	328	185	75	370	270	357	179	73	146
166.02	12	155	440	54	257	130	72	288	282	397	168	59	109
166.04	6	194	504	85	305	107	43	271	206	316	152	156	175
168.01	9	191	301	59	172	155	22	111	83	137	57	59	84
Total	**90**	**765**	**1,777**	**310**	**1,062**	**577**	**212**	**1,040**	**841**	**1,207**	**556**	**347**	**514**

1 Includes agriculture, forestry, fishing, hunting, mining
2 Includes transportation and Warehousing, and utilities
3 Includes finance, insurance, real estate and rental & leasing
4 Includes professional, scientific, management, administrative and waste management
5 Includes education, health and social services
6 Includes arts, entertainment, recreation, accommodation and food services

As ***Table III-18*** illustrates, the agricultural industry employs the fewest persons in the project area (90), and the manufacturing industry employs the most (1,777).
Businesses in the project area were identified through property tax records and a windshield survey. Of the 13,170 persons over the age of 16 living in the project area in 2000, 9,298 people were employed in the project area. Based on the projections from the Delaware Population Consortium, there has been an increase of less than 100 jobs in the area between 2000 and 2005. Most businesses in the area are small, employing fewer than 100 people. A few businesses or commercial areas in the project area include:

Summit Airpark	Happy Harry's	Dove Run Shopping Center
Christiana Care	Ruby Tuesday	Middletown Crossing Shopping Center
Fastenal/Stone Flooring Gallery	Everett Theater	Middletown Shopping Center
WaWa	Ciamaricone's Landscaping	Middletown Square Shopping Center
Bayhealth Medical Center	Cooper Wilburt Vault Company	Ashley Plaza
301 Plaza (truck stop)	Middletown Transcript	Summit Village Shopping Center
Rite Aid	Shone Lumber	Cochran Square
J. Walker Concrete & Masonry	Middletown Chevrolet	Shoppes of Mount Pleasant

The Town of Middletown and Appoquinimink School Districts are the largest employers in the project area. Middletown's largest employers, excluding the school districts, are listed below.

Employer	# Employees	Employer	# Employees
Johnson Controls, Inc.	230	Food Lion (Grocery)	100
Acme (Grocery)	190	NAPA/Quaker City	75
Lowes Home Center	150	MacDermid Imaging Technologies	50
Super G (Grocery)	140	Schagrin Gas	40
DelStar Technologies, Inc.	127	CSR Hydro Conduit	37
Letica Corporation	107		

Source: Rae Teal, Office of the Mayor of Middletown

Most people in the project area, approximately 82 percent, commute to work alone in a private vehicle, as shown in ***Table III-19***, and the mean travel time to work is over 30 minutes. Another 9.5 percent of commuters travel in car or van pools to work.

Table III-19: Mode of Commuting

Geographic Area	Drove Alone	Car Pool	Public Trans	Walk	Other	Work at Home	Total Workers	Mean Travel time (minutes)
Delaware	295,413	42,990	10,354	9,637	3,585	11,091	373,070	24.0
New Castle County	193,564	26,842	9,442	6,748	2,110	6,428	245,134	31.9
166.01	2,404	261	17	89	9	92	2,915	34.8
166.02	2,031	192	50	0	0	128	2,423	33.4
166.04	2,025	264	37	42	81	37	2,520	35.5
168.01	1,114	164	12	12	13	92	1,440	31.9
Total	7,574	881	116	165	103	349	9,298	34 minutes
% of Total	81.5	9.5	1.3	1.6	1.0	3.8		

Source: US Census 2000
Note: Public transportation includes commuting by taxi.

According to the US Census Bureau 2000 Census, the mean household income in the project area in 1999 ranged from $41,937 to $81,083, while *per capita* income ranged from $18,775 to $26,829. ***Tables III-20*** and ***III-21*** provide a profile of household and individual incomes in the project area.

Table III-20: Household Incomes in 1999, in $1000s, in the Project Area

Geographic Area	Number of Households											Median Household Income ($)
	Total Households	Less than $10K	$10K-$15K	$15K–$25K	$25K-$35K	$35K-$50	$50K–$75K	$75K–$100K	$100K-$150K	$150K-$200K	$200K or more	
Delaware	298,755	21,125	15,284	33,898	36,361	50,582	63,663	35,968	28,145	7,549	6,180	47,381
New Castle County	188,947	11,944	7,785	18,761	20,440	29,904	41,058	26,272	21,873	6,088	4,849	52,419
166.01	1,884	69	64	62	182	161	419	437	360	106	24	72,434
166.02	1,387	20	7	59	64	125	327	402	236	108	39	81,083
166.04	1,899	153	70	320	183	371	406	221	133	25	17	41,937
168.01	1,058	41	31	84	81	191	338	164	86	19	23	56,118

Source: US Census 2000

Table III-21: Per capita and Individual Earnings in the Project Area

	Population, 16 Years & Older	Employed in Labor Force	*Per capita* Income ($)	Mean Earnings, Male, Full-Time, Year-Round ($)	Mean Earnings, Female, Full-Time, Year-Round ($)
Delaware	610,289	401,152	23,305	38,961	29,544
New Castle County	389,036	263,440	25,413	42,541	31,829
Tract 166.01	4,067	2,970	25,492	51,671	37,378
Tract 166.02	3,147	2,480	26,829	51,671	36,396
Tract 166.04	3,707	2,661	18,775	36,345	26,520
Tract 168.01	2,249	1,512	25,302	39,583	30,873

Tax Base

New Castle County's budget is derived from ten sources, with the majority funding from real estate taxes (including Real Estate Transfer taxes), at approximately 48 percent of the approved Fiscal Year 2005 budget. Sewer charges and fees make up the next largest portion of revenue at approximately 22 percent. The remaining revenue comes from service charges and fees, personal property taxes, and other miscellaneous revenues.

b. Environmental Consequences and Mitigation

The No-Build Alternative will not directly impact economic resources in the project area. However, the No-Build Alternative will continue to experience increased congestion in the project area as the population increases due to development. This could cause the new development to not reach its full build-out potential, due to lack of access to major roadways and congestion on local roads. The local road congestion would eventually hinder access to local businesses and thereby discourage economic development, as well as slow the transport of goods and services.

Completion of any of the build alternatives is anticipated to lower traffic congestion on local roadways, providing residents better accessibility to businesses located in the project area. Any of the build alternatives would allow easy access to businesses in the project area, which would attract more businesses to the project area. Smaller, local businesses could suffer if larger chain stores move into the area. However, this may also generate a larger employment base. The build alternatives may also decrease drive-by traffic for businesses along the local roadway network resulting in negative effects to existing businesses.

Each of the build alternatives would impact a number of existing businesses (refer to Section A.6.a, ***Table III-11***) along the alignment, requiring them to relocate. This may result in loss of income to the owners and loss of employment for workers in these locations. Relocation assistance will be provided to all businesses affected by the implementation of a build alternative. The build alternatives may also impact planned businesses (commercial, retail, industrial) in the project area, thus altering the projected number of jobs available in the future or altering the locations of these proposed future employment opportunities.

9. Visual and Aesthetic Characteristics

a. Existing Conditions

Within the project area, the visual landscape can be separated into distinct types. To the south and west of Middletown, the landscape is rural in character, consisting mostly of active farmlands (both cropland and horse farms), interspersed wooded areas, historic and more modern farm buildings clustered around farmhouses, and scattered roadside businesses along two-lane roads. Northward, along the ridge route, the look and feel of rural farmland persists, changing toward the northern portion of the project area to include a landscape of modern, single family housing developments intermixed with productive farming areas and open space. Housing developments are clustered close to the Summit Bridge and along the south side of the C&D Canal in the northern portion of the project area, in between existing active farmlands and open fields. This landscape persists along SR 896 (Boyds Corner Road).

The heart of the project area includes the Middletown townscape. An historic district centered at the intersection of Main Street (SR 299) and Broad Street (SR 71) is surrounded by progressively modern structures and well-kept older buildings. The town's landscape still retains a small, rural town feel, although the landscape is continually changing. A new Town Hall and Fire Department are among the latest additions. Newly constructed business and medical centers and small retail centers/strip malls line the main routes that access the town (US 301, SR 299, SR 71). The Norfolk Southern Railroad alignment parallels SR 71 through a portion of the town. North of Middletown, along existing US 301, the landscape is a rural/suburban mix of housing types, historic homes, forested land, and businesses that front the roadway. The Summit Airport covers a large parcel of land north of the town, south of the C&D Canal, in the midst of farms (corn is grown on a portion of the airport's land) and other business enterprises.

There is a new visual aspect and feeling in the project area that is associated with the many newer housing developments that proliferate. Mostly single family homes on modest-sized lots, these new developments have contributed new elements to the disappearing rural farm country

that was once southern New Castle County. New schools under construction include Cedar Lane Middle School, the St. Georges Technical High School on Hyetts Corner Road, and Appoquinimink High School at the southern end of Choptank Road. The Brick Mill Elementary School has enrolled two years. New shopping centers and service-oriented businesses have accompanied this phenomenal residential growth.

b. Environmental Consequences

The No-Build Alternative will have no effect on the visual or aesthetic quality of the project area. Except for the effects of increasing congestion on the roadways, the landscape will continue to evolve from its former rural character to a more suburban nature.

All of the build alternatives would change the aesthetic view of the landscape and the viewsheds that surround them. The construction of a four-lane limited access freeway within the rural and suburban landscape will affect the visual quality of the views of properties immediately surrounding the new roadway as well as other views that are somewhat distant. Although designed to limit impacts to existing natural land cover, farmlands, forests, and open spaces will change in character. In many places, the views of farm fields will be replaced by concrete roadway and traffic, such as along the length of the spur road (Purple and Green Alternatives). The visual effects of the roadway cannot be quantified, but the new roadway will be visible from numerous homes, some of which are historic.

New US 301 will be designed to be at-grade or below grade in most areas, but will be elevated up to 25 feet above grade at overpasses and as high as 30 feet above grade at the interchange with SR 1. In some locations, such as adjacent to the Grande View Farms development, the roadway will remain elevated for over 2,000 feet with the Yellow and Purple Alternatives. Earthworks, graded and landscaped, will support overpassing roadways and access ramps wherever possible, and stormwater management ponds will be designed with sensitive native and wetland plantings. Low bridge structures will cross streams and sensitive wetland areas.

Additional visual impacts along US 301 will result from the installation of overhead signage and toll collection facilities that include a toll plaza near the Delaware/Maryland line and collection facilities on north-serving ramps.

c. Mitigation

Earth berms are proposed to be constructed in several locations along US 301, including adjacent to the communities of Southridge, Middletown Village, Springmill, Chesapeake Meadow, Summit Bridge Farms, residences on Ratledge Road, Lea Eara Farms and Airmont, in order to screen these residential areas from the new roadway construction. The proposed berms would be between 1,400 feet and 2,840 feet long and would be between six feet and 16 feet high. In addition, visual and aesthetic effects to historic properties would be evaluated and considered for mitigation, which could be in the form of earthen berms, privacy screens or fencing. Mitigation will be considered in coordination with the Delaware SHPO and affected property owners but has not yet been determined.

The roadway design includes a wide (66 feet in most places) median with appropriate landscaping. Appropriate tree plantings may be included along the outside of the roadway during the final design, to provide some additional visual screening. Wherever possible, the roadway would be constructed at-grade or below, and, in most locations where overpasses are required, the smaller, local roadway will be elevated to cross over the larger US 301 roadway to lessen the visual impacts on the surrounding community. Roadway lighting, where required for safety considerations, would be designed to focus its effect on the roadway and lessen the visual impact of light on the surrounding landscape.

B. Cultural Resources

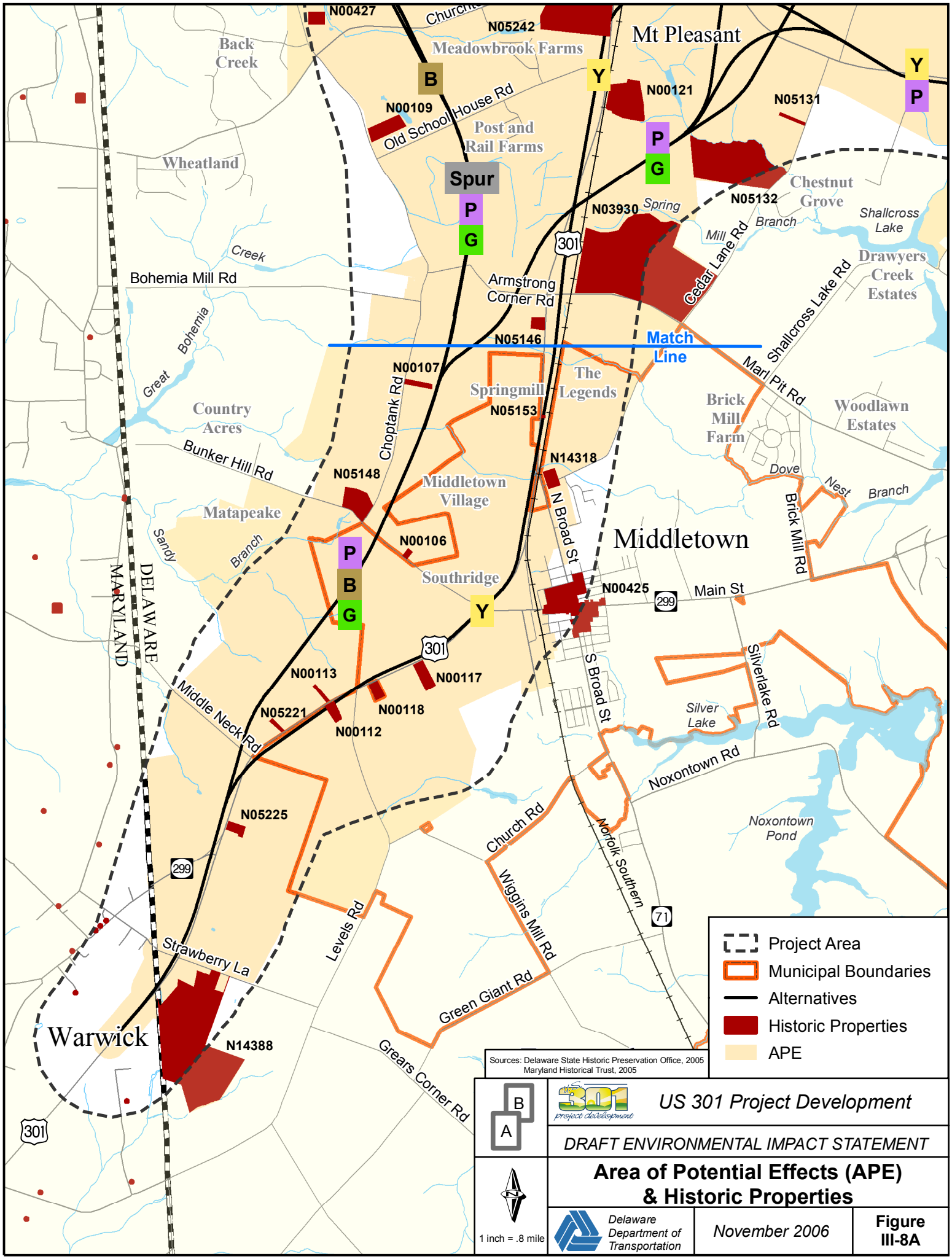
Cultural resources are defined as patterned physical remains of human activity distributed over the landscape through time. Specifically, cultural resources are classified as architectural resources (buildings, structures), objects, archaeological sites, cultural landscapes, and districts, as defined by the National Register of Historic Places (36 CFR 60.4). A district is a significant concentration of one or more of the types of cultural resources listed above. Cultural resources in the project vicinity, potential effects and potential avoidance, minimization and mitigation strategies are discussed below.

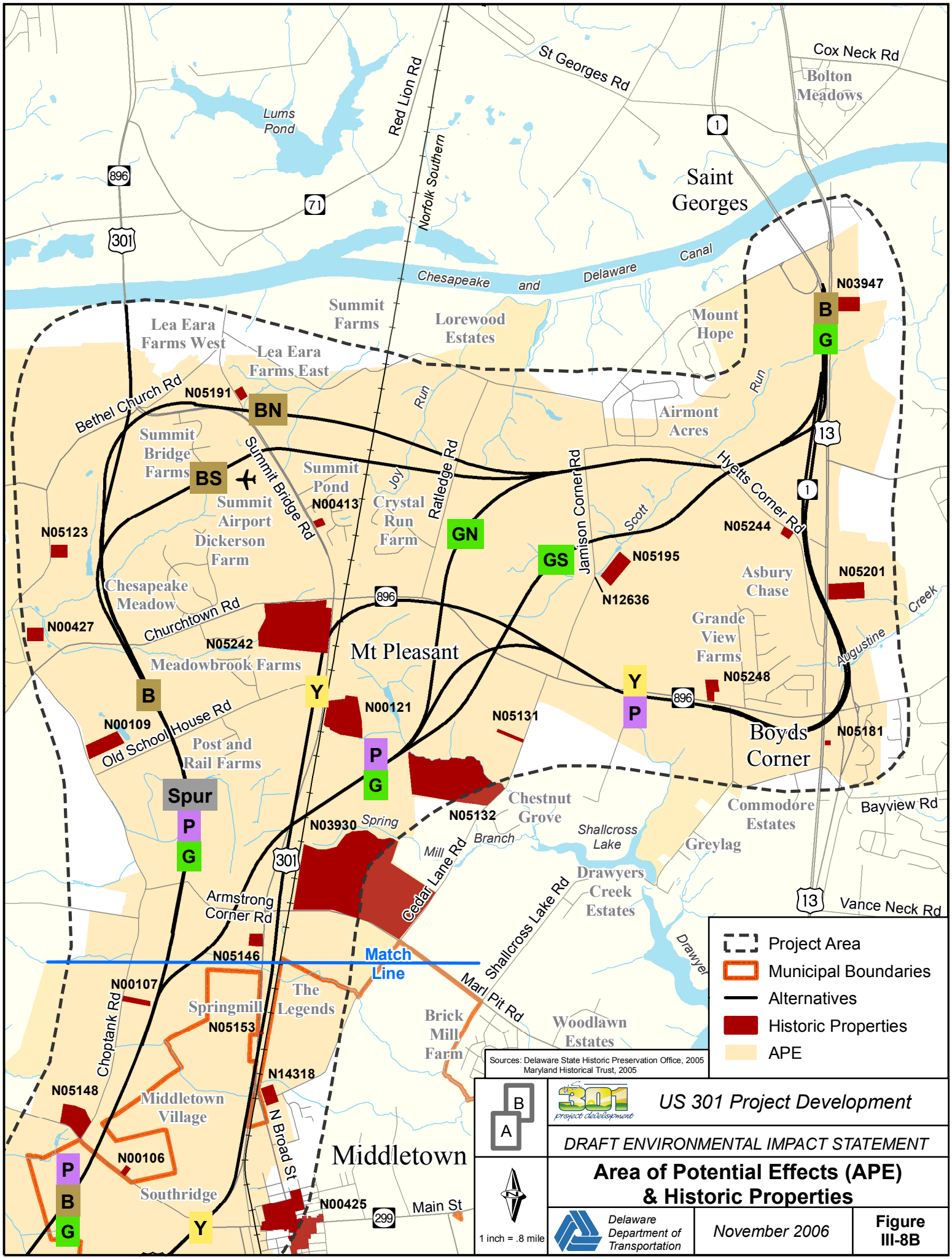
1. Existing Conditions

a. Architectural Resources

DelDOT undertook background research, development of a historic context, and a windshield survey of the initial Area of Potential Effect (APE) to identify the known and potential historic resources in the APE and reported their findings in the *Historic Context and Reconnaissance Survey Report* (July 2005). The initial APE was defined as the area within 600 feet of the centerlines of the alternatives under review at the time (Yellow, Orange, Purple, Brown, and Green) without exclusions.

An evaluation level survey was performed in July, August and September 2005 to assess resources for eligibility for the National Register of Historic Places. DelDOT and the SHPO consulted regarding the scope of the evaluation level survey effort at meetings on July 28 and August 10, 2005, and the APE was revised to address design changes to the alternatives. A Draft *Determination of Eligibility Report* (September 2005) reported the results of the evaluation level survey. The final APE for the alternatives retained for detailed evaluation (Yellow, Purple, Brown and Green Alternatives) as adjusted for potential indirect visual and audible effects, is shown in ***Figure III-8***.


N00427
N05242
Meadowbrook Farms
Mt Pleasant
Back Creek
B
Y
N00121
N05131
Y
P
N00109
Old School House Rd
Post and Rail Farms
P
G
Wheatland
Spur
P
G
Chestnut Grove
N05132
N03930
Spring Branch
Shallcross Lake
Mill Rd
Cedar Lane Rd
301
Drawyers Creek Estates
Creek
Bohemia Mill Rd
Armstrong Corner Rd
Shallcross Lake Rd
N05146
Match Line
Great Bohemia
N00107
The Legends
Springmill
Marl Pit Rd
Brick Mill Farm
Woodlawn Estates
Country Acres
Choptank Rd
N05153
Bunker Hill Rd
N14318
N05148
Middletown Village
Dove Nest Branch
Brick Mill Rd
Matapeake
N00106
N Broad St
Middletown
Sandy Branch
P
B
G
Southridge
Y
N00425
Main St
299
MARYLAND
DELAWARE
301
S Broad St
Silverlake Rd
N00113
N00117
Middle Neck Rd
N05221
N00118
N00112
Silver Lake
Noxontown Rd
N05225
Church Rd
Norfolk Southern
Noxontown Pond
299
Levels Rd
Wiggins Mill Rd
71
Strawberry La
Green Giant Rd
Warwick
N14388
Grears Corner Rd
301
Project Area
Municipal Boundaries
Alternatives
Historic Properties
APE
Sources: Delaware State Historic Preservation Office, 2005
Maryland Historical Trust, 2005
B
A
1 inch = .8 mile
US 301 project development
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Area of Potential Effects (APE) & Historic Properties
Delaware Department of Transportation
November 2006
Figure III-8A


Saint Georges
Chesapeake and Delaware Canal
Red Lion Rd
St Georges Rd
Cox Neck Rd
Bolton Meadows
Lums Pond
Norfolk Southern
Summit Farms
Lea Eara Farms West
Lea Eara Farms East
Lorewood Estates
Mount Hope
Airmont Acres
Bethel Church Rd
Summit Bridge Farms
Summit Bridge Rd
Summit Airport
Dickerson Farm
Summit Pond
Crystal Run Farm
Ratledge Rd
Jamison Corner Rd
Hyetts Corner Rd
Scott Run
Joy Run
Asbury Chase
Grande View Farms
Augustine Creek
Chesapeake Meadow
Churchtown Rd
Meadowbrook Farms
Mt Pleasant
Old School House Rd
Post and Rail Farms
Boyds Corner
Chestnut Grove
Commodore Estates
Bayview Rd
Spring Mill Branch
Shallcross Lake
Greylag
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Vance Neck Rd
Armstrong Corner Rd
Match Line
Marl Pit Rd
Drawyer Creek
Woodlawn Estates
Brick Mill Farm
The Legends
Springmill
Choptank Rd
Middletown Village
N Broad St
Middletown
Southridge
Main St
N03947
N05191
N00413
N05123
N05244
N05195
N12636
N05201
N00427
N05242
N05248
N00121
N05131
N00109
N05181
N03930
N05132
N05146
N00107
N05153
N14318
N05148
N00106
N00425
BN
BS
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GS
B
G
Y
P
Spur
1 inch = .8 mile
Project Area
Municipal Boundaries
Alternatives
Historic Properties
APE
Sources: Delaware State Historic Preservation Office, 2005
Maryland Historical Trust, 2005
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Area of Potential Effects (APE) & Historic Properties
Delaware Department of Transportation
November 2006
Figure III-8B

DelDOT, SHPO, FHWA, and New Castle County staff conducted a field tour to review and discuss the results of the evaluation level study of architectural resources on November 4, 2005. As a result of that meeting as well as additional DelDOT and SHPO comments on the draft eligibility report, supplemental information was prepared for several of the surveyed resources. A few additional resources were identified and evaluated, as alternatives were refined, and the APE adjusted accordingly. The evaluation of historic architectural resources was completed in August, 2006; the results of the surveys will be reported in the Final *Determination of Eligibility Report*. A total of 31 historic properties- resources listed in or determined eligible for listing in the National Register of Historic Places- were identified. *Table III-22* lists these properties, along with their status (listed or eligible), and the alternatives that may affect them.

Table III-22: Historic Properties[1] within the Area of Potential Effect

Cultural Resources Survey #	Resource Name	National Register Status	Within 600' of Alternative(s)[1]
N00106	The Maples; George Derrickson House (Beers 1868) 1023 Bunker Hill Road	Listed	Purple, Brown, and Green
N00107	S. Holton Farm 2010 Choptank Rd	Listed	Purple, Brown and Green
N00109	Choptank 1542 Choptank Road	Listed	Purple, Brown and Green[2]
N00112	Summerton; John Cochran House 840 Middletown Warwick	Eligible	Yellow, Purple, Brown, and Green
N00113	Rumsey Farm 841 Middletown Warwick Rd	Listed	Yellow, Purple, Brown, and Green
N00117	Cochran Grange; John P. Cochran House 704 Middletown Warwick Rd	Listed	Yellow
N00118	Hedgelawn; Kohl House; Wm R. Cochran House 772 Middletown Warwick Rd	Listed	Yellow
N00121	Weston; S. Brady Farm 4677 Summit Bridge Rd	Listed	Yellow and Purple
N00413	A. Eliason House; Twin Holly Farms 4353 Summit Bridge Farm	Listed	Yellow and Brown[2]
N00425	Middletown Historic District Main Street & Broad Street	Listed	Yellow[2]
N00427	Woodside; Henry Clayton House 1358 Choptank Rd	Listed	Purple, Brown and Green[2]
N03930	Achmester N Side of Marl Pit Rd, One Mile E of Summit Bridge Rd	Listed	Yellow
N03947	Idalia Manor; Mrs. M.A. Osborne 1870 S. Dupont Highway	Listed	Yellow, Purple, Brown, and Green
N05123	Governor Benjamin T. Biggs Farm Choptank Road	Listed	Purple, Brown and Green[2]
N05131	T.J. Houston Farm (Beers 1868) 1309 Cedar Lane	Eligible	Purple and Green[2]
N05132	Lovett Farm/Mrs. Templeman House (Beers 1868) 1405 Cedar Lane Rd	Eligible	Purple and Green
N05146	Armstrong-Walker House; J. Cox Estate 5036 Summit Bridge Rd	Listed	Yellow
N05148	Rosedale; Mary Del Farm 1143 Bunker Hill Rd	Listed	Purple, Brown and Green
N05153	R.G. Hayes House 5187 Summit Bridge Rd	Eligible	Yellow
N05181	J.M. Vandergrift House; Elm Grange 2424 S. Dupont Highway	Listed	Yellow and Purple

Table III-22: Historic Properties[1] within the Area of Potential Effect

Cultural Resources Survey #	Resource Name	National Register Status	Within 600' of Alternative(s)[1]
N05191	S. Rothwell House; Green Forest Farm 669 Old Summit Bridge Rd	Eligible	Brown
N05195	J. Houston House (Beers 1868) 1000 Jamison Corner Rd	Eligible	Green South
N05201	Retirement Farm 2256 Dupont Hwy N	Listed	Yellow and Purple[2]
N05221	C. Polk House Estate 929 Middletown Warwick Rd	Eligible	Yellow, Purple, Brown, and Green
N05225	B.F. Hanson House 1102 Middletown Warwick Rd	Listed	Yellow, Purple, Brown, and Green
N05242	Mt. Pleasant Farm 4564 Summit Bridge Rd	Eligible	Yellow
N05244	"Fairview"; A.H. Diehl House (Beers 1868) 350 Hyetts Corner Rd	Eligible	Yellow and Purple
N05248	S.F. Shallcross House 1049 Boyds Corner Rd	Eligible	Yellow and Purple
N12636	State Bridge Number 383 Jamison's Corner Rd	Eligible	Green South
N14318	Forest Cemetery 1000 N. Broad Street	Eligible	Yellow
N14388	Shahan Farm, Lanape Acres 389 Strawberry Lane	Eligible	Yellow, Purple, Brown, and Green

[1] *Architectural Resources listed in or determined eligible for the National Register of Historic Places located in the Area of Potential Effect (APE) based on consultation with between DelDOT and the SHPO.*
[2] *Properties are more than 600 feet from the alternative(s), but may be affected by noise or visual impacts.*

b. Archeological Resources

An historic context and archeological predictive model were prepared for the initial APE, covering the Yellow, Orange, Purple, Brown and Green Alternatives, and documented in the *Archeological Predictive Model Report* (A.D. Marble and Company, July 2005; revised September 2005).

The model was prepared as a planning tool to assist in the development of the designs for the various alternatives under consideration for the project and to aid in the assessment of their relative potential impacts on archeologically sensitive areas. Both prehistoric (referring to pre-contact Native American history) and historic archeological potential are considered in this model. Characterization of the environment has been accomplished using data available in Geographic Information System (GIS) format, and GIS has been used to compare the relative significance of the criteria within the various parts of the project area. Historic and modern ground disturbances were modeled to qualify the areas of archeological potential relative to their likely integrity.

The results of the model are zones characterized by their probability to contain prehistoric and historic archeological resources. These areas were illustrated in the September 2005 report and reviewed by archeologists on staff at DelDOT and the SHPO. Illustrations of these areas are not provided here for the protection of the known and potential site areas. Section 304 of the

National Historic Preservation Act, 36 CFR Part 800.11 of the Advisory Council on Historic Preservation's regulations implementing Section 106 of that same Act, and Delaware Code Title 7, Chapter 53, § 5314 permits the restriction of access to information on the location and nature of archeological resources.

Additional efforts to identify potential archeological resources to date have included a limited testing of the predictive model for prehistoric archaeological sites. This included a partial survey of DelDOT-owned parcels located within areas affected by multiple alternatives along the ridge alignment. The additional efforts tested the hypotheses of the predictive model and mapped one known archeological site. The survey, performed in June/July 2006, included plow-and-walk surface surveys and shovel testing, covering areas that had been identified as having high, medium, or low probability to contain archeological sites. The results of this survey appear to support the hypotheses. The model has since been refined to include the retained alternatives (as shown in **Appendix A**) and the boundaries of the jurisdictional wetlands (see **Chapter III, Section F.7**). The results of the limited testing and the revised model are under review by DelDOT and SHPO staff.

DelDOT is committed to performing the necessary archeological analysis to determine National Register eligibility for archeological resources in the project area. At this time, a comprehensive Phase I archeological assessment has not been completed. It is anticipated that following the identification of a Preferred/Selected Alternative a Memorandum of Agreement (MOA) will be prepared to establish the process for identifying archeological resources and evaluating their eligibility for the National Register within the Preferred Alternative. Additional efforts may include a more comprehensive Phase I analysis, and, as a result of this analysis, consultation on the need for further investigation.

2. Environmental Consequences

Section 106 of the National Historic Preservation Act and its regulations (36 CFR 800) require that, once historic resources in the undertaking's APE are identified, the potential effects shall be assessed to determine if the undertaking will adversely affect one or more historic properties. According to the regulations, examples of adverse effects include [36 CFR 800.5(a)(2)]:

(i) physical destruction or damage to all or part of property
(ii) alteration of property not consistent with Secretary's Standards
(iii) removal of a property from its historic location
(iv) change in character of a property's use or of physical features within setting provided they contribute to its significance
(v) introduction of visual, audible, or atmospheric elements that diminish integrity
(vi) neglect of property
(vii) transfer, lease, or sale of property without adequate protection measures

The potential effects of the undertaking on cultural resources, to the degree that they can be assessed with the information currently available, are discussed in the following sections. While the architectural resources in the APE have been identified, the archeological resources have not been fully identified. Data from the archaeological predictive models have been used for the

current analysis. The Section 106 regulations allow for the phased identification of historic properties. The MOA will outline the process for completing the identification, evaluation and assessment of effects on archaeological sites.

a. Architectural Resources

Preliminary evaluation of the proposed alternatives indicates that only the Yellow Alternative would physically affect architectural historic properties. The Yellow Alternative would require a total take of Summerton (N00112) and the R.G. Hayes House (N05153). The Yellow Alternative would also take a portion of the Armstrong-Walker House (N05146) and Mount Pleasant Farm (N05242), using land along each property's existing frontage with US 301, but would not affect any significant buildings or structures.

The Yellow, Purple, Brown and Green Alternatives may audibly and visually affect architectural historic properties. ***Table III-23*** details the potential for physical, audible and visual effects of the alternatives. The indirect effects of the Purple Alternative would be evaluated for the most (22) historic resources. The Green Alternative North and South Options would be evaluated for the next most (21). Potential indirect effects of the Brown Alternative would be evaluated for the least number (North Option – 17; South Option – 16) of resources. The Yellow Alternative would be evaluated for potential indirect effects on 17 historic resources as well as for direct physical impacts on four historic properties.

The Brown Alternative (North and South Options) would affect one additional potentially eligible property, the J. Biggs House located at 939 Bethel Church Road (N06320). The initial survey indicated that this house may include an early structure that was covered by later additions. The National Register eligibility of this resource has not yet been evaluated, as the full investigation would require removal of parts of the building. If the Brown Alternative were selected as the Preferred Alternative, such investigation would be covered by the phased process outlined in the MOA, as discussed for archaeological sites above.

DelDOT and the SHPO, through further consultation with FHWA and additional consulting parties, and the application of the Criteria of Adverse Effect, will determine if architectural resources within the APE of the recommended Preferred Alternative will be adversely affected, as defined by the Section 106 regulations. The determination of adverse effects, as well as potential avoidance, minimization and mitigation efforts that will be undertaken as a result of this determination will be identified and documented in the Final Environmental Impact Statement (FEIS). DelDOT expects that a signed and executed MOA to resolve those adverse effects would be included in the FEIS and the Record of Decision (ROD) for the project.

Table III-23: Potential Effects of the Retained Alternatives on Historic Properties

CRS #	Historic Property Name	NR Status	Potential Effect					
			Yellow	Purple	Brown North	Brown South	Green North	Green South
N00106	The Maples; George Derrickson House (Beers 1868)	Listed	V,A	V,A	V,A	V,A	V,A	V,A
N00107	S. Holton Farm	Listed		V,A	V,A	V,A	V,A	V,A
N00109	Choptank	Listed		V,A	V,A	V,A	V,A	V,A
N00112	Summerton; John Cochran House	Eligible	P	V,A	V,A	V,A	V,A	V,A
N00113	Rumsey Farm	Listed	V,A	V,A	V,A	V,A	V,A	V,A
N00117	Cochran Grange; John P. Cochran House	Listed	V,A	V,A	V,A	V,A	V,A	V,A
N00118	Hedgelawn; Kohl House; Wm R. Cochran House	Listed	V,A	V,A	V,A	V,A	V,A	V,A
N00121	Weston; S. Brady Farm	Listed	V,A	V,A			V,A	V,A
N00413	A. Eliason House; Twin Holly Farms	Listed			V,A			
N00425	Middletown Historic District	Listed						
N00427	Woodside; Henry Clayton House	Listed		V,A	V,A	V,A	V,A	V,A
N03930	Achmester	Listed	V,A	V,A			V,A	V,A
N03947	Idalia Manor; Mrs. M.A. Osborne	Listed			V,A	V,A	V,A	V,A
N05123	Governor Benjamin T. Biggs Farm	Listed		V,A	V,A	V,A	V,A	V,A
N05131	T.J. Houston Farm (Beers 1868)	Eligible		V,A			V,A	V,A
N05132	Lovett Farm/Mrs. Templeman House (Beers 1868)	Eligible		V,A			V,A	V,A
N05146	Armstrong-Walker House; J. Cox Estate	Listed	P,V,A	V,A	V,A	V,A	V,A	V,A
N05148	Rosedale; Mary Del Farm	Listed		V,A	V,A	V,A	V,A	V,A
N05153	R.G. Hayes House	Eligible	P					
N05181	J.M. Vandergrift House; Elm Grange	Listed	V,A	V,A				
N05191	S. Rothwell House; Green Forest Farm	Eligible	V,A		V,A	V,A		
N05195	J. Houston House (Beers 1868)	Eligible					V	V,A
N05201	Retirement Farm	Listed	A	A				
N05221	C. Polk House Estate	Eligible	V,A	V,A	V,A	V,A	V,A	V,A
N05225	B.F. Hanson House	Listed	V,A	V,A	V,A	V,A	V,A	V,A
N05242	Mt. Pleasant Farm	Eligible	P, V,A					
N05244	"Fairview"; A.H. Diehl House (Beers 1868)	Eligible	V,A	V,A				
N05248	S.F. Shallcross House	Eligible	V,A	V,A				
N12636	State Bridge Number 383	Eligible					V	V
N14318	Forest Cemetery	Eligible	V,A					
N14388	Shahan Farm, Lanape Acres	Eligible	V,A	V,A	V,A	V,A	V,A	V,A

[*]Architectural Resources listed on or determined eligible for the National Register of Historic Places located in the APE.
CRS = Cultural Resources Survey
NR = National Register of Historic Properties
V = VISUAL effects of the alternative on the property to be evaluated.
A = AUDIBLE effects of the alternative on the property to be evaluated.
P = PHYSICAL effects of the alternative on the property to be evaluated.

In accordance with Section 4(f) of the US Department of Transportation Act (49 USC Section 303), a preliminary discussion was undertaken to assess whether the physical takings of the Yellow Alternative on historic properties could be avoided. Attempts to adjust the Yellow Alternatives alignment to avoid all historic properties (as well as other Section 4(f) properties such as public parks) were determined not feasible and prudent, as there would be an accumulation of adverse socioeconomic impacts that are unacceptable and severe, would cause extraordinary community disruption, and represent an accumulation of factors that collectively reach an extraordinary magnitude. During the discussion, the Purple, Green and Brown

Alternatives, which do not physically make use of any historic sites, were identified as feasible and prudent avoidance alternatives. Thus, no formal Section 4(f) Evaluation is included in this document. The preliminary discussion is included as **Appendix H**.

b. Archeological Resources

In order to evaluate the potential consequences of the retained alternatives, DelDOT overlaid the archeological predictive model on the proposed limit of disturbance of each of the alternatives and determined the areas of each sensitivity level affected by the alternatives. The evaluation includes areas that may be affected by potential stormwater management currently proposed for the project. The results of that evaluation are reported in ***Table III-24*.**

When the prehistoric sensitivity of the Yellow, Purple, Brown and Green Alternatives are compared, between 64 and 86 percent of the area of each alternative is within the "Nil" and "Low" probability zones; therefore, large areas of each alternative are not very likely to contain prehistoric sites. The range of variation in the probability of prehistoric sites among the alternatives indicates that the Yellow Alternative is the least likely (13.9 percent "High" to "Moderate" sensitivity) to affect prehistoric sites. The Purple, Brown and Green Alternatives, while still having a relatively low probability (between 25.7 and 36.0 percent in the "High" and "Moderate" sensitivity range), are the most likely to affect prehistoric sites. This conclusion is consistent with the characteristics of the alternatives and the nature of the location of prehistoric sites.

The Yellow Alternative, which generally follows existing roadways, is located in an area where ground disturbance over the years has reduced the potential for intact subsurface resources from the prehistoric period. Conversely, the Purple, Brown and Green Alternatives, which cross relatively undeveloped areas, are more likely to encounter undisturbed resources. It is anticipated that the Purple, Brown, and Green Alternatives would have the greatest possibility of affecting prehistoric archeological sites by destroying or burying potential resources.

When the alternatives are compared to the historic sensitivity zones, between 58.6 and 76.8 percent of the area of each alternative is within the "Low" probability zones. (The historic component of the model does not include a "Nil" probability zone.) The range of variation in the probability of historic archaeological sites among the alternatives indicates that the Purple, Brown and Green Alternatives are the least likely (under 25 percent probability for "High" and "Moderate" sensitivity) to affect historic sites; and the Yellow Alternative, with 41.1 percent within the "High" or "Moderate" sensitivity zones, is the most likely to affect historic archeological sites. Again, this conclusion is consistent with the characteristics of the alternatives and the nature of the location of historic sites.

Historic sites are more likely to be located relatively near historic-period and current roadways; thus, the Yellow Alternative, which follows existing roadways, has a higher potential to encounter such sites. The Yellow Alternative would have the greatest possibility of affecting historic archeological sites by destroying or burying potential resources. Conversely, the Purple, Brown, and Green Alternatives, which cross historically undeveloped areas, are less likely to encounter such resources.

Table III-24: Archeological Potential of the Alternatives within the Limit of Disturbance

Archeological Potential	Yellow acres %[1]	Purple acres %[1]	Brown North acres %[1]	Brown South acres %[1]	Green North acres %[1]	Green South acres %[1]
Prehistoric-Era Archeological Predictive Model						
Area in High Sensitivity Zone	16 1.8%	24 2.7%	26 2.9%	28 3.0%	26 2.8%	28 3.1%
Area in Moderate Sensitivity Zone	106 12.1%	212 23.1%	287 31.5%	272 29.9%	238 26.1	292 32.8%
Area in Low Sensitivity Zone	528 60.3%	552 60.3%	496 54.4%	483 53.1%	558 61.3%	482 54.1%
Area in Nil Sensitivity Zone	225 25.7%	128 14.0%	101 11.1%	127 14.0%	89 9.7%	88 9.9%
Historic-Era Archeological Predictive Model[2]						
Area in High Sensitivity Zone	91 10.4%	35 3.8%	30 3.3%	31 3.4%	34 3.7%	32 3.6%
Area in Moderate Sensitivity Zone	272 31.0%	187 20.4%	186 20.4%	182 20.0%	177 19.4%	177 19.8%
Area in Low Sensitivity Zone	513 58.6%	694 75.7%	694 76.3%	696 76.5%	700 76.8%	682 76.6%

[1] *Indicates percent of total acres within the limit of disturbance.*
[2] *The historic-era model does not have a nil sensitivity zone.*

DelDOT is continuing to consult with FHWA, the SHPO and New Castle County regarding the appropriate steps to further identify archeological resources and the potential effects of the project on those resources. As will be discussed in the MOA, DelDOT will conduct appropriate Phase I and/or Phase II testing to identify archeological resources along the Selected Alternative. If resources are discovered which are eligible for the National Register, DelDOT and FHWA will consult with the SHPO to determine if the sites will be adversely affected, and if so, will look for ways to avoid impacts or minimize impacts. If appropriate, DelDOT will investigate using Phase III data recovery prior to impacting significant resources.

An MOA, identifying mitigation of any effects on architectural and archeological resources, would be included in the FEIS and the Record of Decision for the project. DelDOT will also continue to consult with the Maryland SHPO (Maryland Historical Trust) on potential effects to cultural resources within the Maryland portion of the project area. The Maryland SHPO will also be consulted on potential secondary and cumulative effects that may result from traffic and truck diversions (see **Chapter III, Section G**).

C. Air Quality

The purpose of this air quality section is to describe the regulatory framework for air quality considerations, the pollutants of concern, ambient air quality standards, existing conditions in the project area, predicted changes in air quality that may result from implementation of the project, and possible mitigation efforts where adverse effects are projected.

Transportation projects involving highway systems improvements are typically subject to two types of air quality analyses. These are referred to as transportation conformity analysis (mesoscale analysis) and project level emissions analysis (microscale analysis).

Transportation conformity refers to the extent to which highway and transit expansion projects add to or subtract from regional emission levels. These analyses typically are performed at the system level, which means the particular improvement or sets of improvements are included in a regional travel demand model from which the total emissions for a county are estimated. The product of these analyses is an estimate referring to the total emissions generated from highway and transit systems, and a determination of whether those estimates, at the regional level, follow mandated Federal reductions in regional emissions as reported in State Implementation Plans (SIPs).

Project level emissions analyses refer to the extent to which highway and transit expansion projects add or subtract to project area emission levels. These studies are typically performed within the area directly adjacent to a proposed improvement, and are often within several hundred feet of those projects. These studies do not consider regional air quality levels, but are concerned with what affect proposed projects may have on air quality levels adjacent to or in the immediate vicinity of a particular area.

1. Relevant Pollutants

"Air Pollution" is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or by adversely affecting human or animal health.

Eight air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), sulfur oxides (SO_x), hydrocarbons (HC), nitrogen oxides (NO_x), ozone (O_3), lead (Pb), particulate matter with a size of 10 microns or less (PM_{10}), and particulate matter with a size of 2.5 microns or less ($PM_{2.5}$). These pollutants, with the exception of HC, are collectively referred to as "criteria" pollutants.

The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. In the project corridor, ambient concentrations of CO, O_3 and Pb are primarily influenced by motor vehicle activity. Emissions of sulfur oxides are associated mainly with various stationary sources such as power plants and refineries. Emissions of nitrogen oxides and particulate matter come from both mobile and stationary sources.

Carbon monoxide is a colorless and odorless gas, which in the urban environment is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High CO concentrations can lead to headaches, aggravation of cardiovascular disease and impairment of central nervous system functions. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded

intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of carbon monoxide are limited to locations within a relatively short distance, 300 to 600 feet, of heavily traveled roadways. Consequently, it is appropriate to evaluate concentrations of CO on a regional and on a localized or microscale basis. In general, CO emissions have been decreasing as a result of the State and Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

Sulfur oxides (SO_x) constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of great importance. The health effects of SO_x include respiratory illness, damage to the respiratory tract, and bronchioconstriction. Relatively little SO_x is emitted from motor vehicles.

Hydrocarbons (HC) include a wide variety of volatile organic compounds (VOC) emitted principally from the storage, handling and use of fossil fuels. Though hydrocarbons can cause eye irritation and breathing difficulty, their principal health affects are related to their role in the formation of O_3.

Nitrogen oxides (NO_x) are of concern because of their role as precursors in the formation of O_3. Most of the NO_x emitted by motor vehicles or construction combustion equipment is in the form of nitric oxide (NO), which is not directly harmful to human health. Only a small percentage is emitted as nitrogen dioxide (NO_2), which can cause lung irritation and decrease the capacity of lungs. High levels of NO_2 have been shown to increase the risk of asthma in children living near freeways. Once emitted, NO reacts slowly in the presence of sunlight with O_3 to form NO_2. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated NO_2 and O_3 levels are often found many miles from their sources. For that reason, the affects of hydrocarbons and nitrogen oxide emissions are generally examined on a regional basis, and not at a localized level.

Ozone is the principal component of photochemical smog. O_3 is a principal cause of lung and eye irritation in the urban environment. It is formed in the atmosphere through a series of reactions involving hydrocarbons and nitrogen oxides in the presence of sunlight. High O_3 concentrations normally occur only in the summer, when insulation is greatest and temperatures are high.

Particulate matter includes both liquid and solid particles of a wide range of sizes and composition. Of particular concern are those particles that are smaller than or equal to 10 microns or 2.5 microns in size (PM_{10} and $PM_{2.5}$, respectively). The data collected through several nationwide studies indicate that most PM_{10} is the product of fugitive dust, wind erosion and agricultural and forestry sources, while a small portion is the product of fuel combustion processes. Conversely, the combustion of fossil fuels accounts for a significant portion of $PM_{2.5}$. The main health affects of air-borne particulate matter are on the respiratory system.

Lead is a stable compound, which persists and accumulates both in the environment and in animals. In people it affects the blood-forming (hematopoietic) system, the nervous system and the renal system. In addition, lead has been shown to affect the normal functions of the

reproductive, endocrine, hepatic, cardiovascular, immunologic and gastrointestinal systems. There is significant individual variability in response to lead exposure. The lead used in gasoline anti-knock additives historically represented a major source of lead emissions to the atmosphere. However, lead emissions have significantly decreased due to the mandated elimination of leaded gasoline, and the replacement of vehicles that burn leaded gasoline with those that cannot. In general, an analysis of lead is only performed for projects that emit significant quantities of the pollutant (e.g., lead smelters) or are near such projects.

In conclusion, of the eight criteria pollutants identified by the EPA as being of nationwide concern, CO is the only pollutant whose localized effects currently require a detailed, microscale mobile source impact evaluation for roadway projects at the EIS level. The regional effects of the project on O_3 levels are considered in the regional CO, NO_x and HC emissions analysis performed by the Wilmington Area Planning Council (WILMAPCO) as part of the Transportation Improvement Plan (TIP) for the region.

In accordance with the recent (*Federal Register*, Volume 71, Number 47, March 10, 2006) regulations, the referenced final rule requires a qualitative $PM_{2.5}$ hot-spot analysis only for projects of air quality concern, ***i.e.***, those that involve significant levels of diesel vehicle traffic. Although the 2030 percentage of total truck traffic (including diesel trucks) on new US 301 is projected to exceed the eight percent guidance maximum (7-9 percent on most segments of the roadway; 20 percent at the state line), the average vehicles per day is less than half the maximum 125,000 AADT recommended for the analysis (the highest ADT is projected at 56,700). Because the new US 301 does not encourage new diesel truck traffic, but merely shifts the diesel truck traffic from existing US 301 to the new roadway, it does not represent a significant increase in diesel truck traffic. A $PM_{2.5}$ analysis is not included for the project.

2. National and State Ambient Air Quality Standards

As required by the Clean Air Act Amendments of 1970 (P.L. 91-064, December 31, 1970) and the Clean Air Act Amendment of 1977 (P.L. 95-95, August 7, 1977), the EPA has established National Ambient Air Quality Standards (NAAQS) for the following air pollutants: O_3, CO, NO_2, SO_x, PM_{10}, $PM_{2.5}$, and Pb. Delaware has also promulgated ambient air quality standards for the same pollutants. Applicable state and federal standards are shown in ***Table III-25***. The Primary Standards have been established to protect the public health with an adequate margin of safety. The Secondary Standards are intended to protect the nation's welfare and account for air-pollutant affects on soil, water, visibility, vegetation and other aspects of the general welfare.

3. Air Quality Regulations and Status of the Project Area

Air quality is regulated at the federal level under the Clean Air Act (CAA) and EPA's Final Conformity Rule (40 CFR Parts 51 and 93). Section 107 of the 1977 Clean Air Act Amendment requires the EPA to publish a list of all geographic areas in compliance with the NAAQS, as well as those not attaining the NAAQS. Areas not in compliance with NAAQS are deemed non-attainment areas. Areas which were previously deemed non-attainment areas, but which recently achieved compliance with the NAAQS, are deemed maintenance areas. The designation of an

area is based on the data collected by the state-monitoring network on a pollutant-by-pollutant basis.

Table III-25: National and State Ambient Air Quality Standards

Pollutant	Averaging Period	National and State Standards	
		Primary	Secondary
Ozone (O_3)	1 Hour [a]	0.12 ppm (235 µg/m^3)	Same as Primary Standard
	8 Hour [b]	0.08 ppm (157 µg/m^3)	
Carbon Monoxide (CO)	1 Hour [c]	35 ppm (40 mg/m^3)	---
	8 Hour [c]	9 ppm (10 mg/m^3)	---
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 µg/m^3)	Same as Primary Standard
Sulfur Dioxide (SO_2)	Annual Average	0.03 ppm (80 µg/m^3)	---
	24 Hour [c]	0.14 ppm (365 µg/m^3)	---
	3 Hour [c]	---	0.5 ppm (1300 µg/m^3)
Suspended Particle Matter (PM_{10})	Annual Arithmetic Mean	50 µg/m^3	Same as Primary Standard
	24 Hour [d]	150 µg/m^3	Same as Primary Standard
Suspended Fine Particle Matter ($PM_{2.5}$)	Annual Arithmetic Mean	15 µg/m^3	Same as Primary Standard
	24 Hour[e]	65 µg/m^3	Same as Primary Standard
Lead (Pb)	Calendar Quarter	1.5 µg/m^3	Same as Primary Standard
Total Suspended Particle (TSP)	Annual Geometric Mean	75 µg/m^3	60 µg/m^3
	24-Hour[c]	260 µg/m^3	150 µg/m^3

Source: Delaware Air Quality Management Section, Division of Air and Waste Management, Department of Natural Resources and Environmental Control, "Delaware Annual Air Quality Report 2003"Delaware Air Quality Management Section, "Ambient Air Quality Standards (Regulation 3.)"

Notes:
a. Based on a 3-year average of annual averages
b. 3-year average of the 4th highest 8-hour concentration may not exceed 0.08 ppm
c. Not to be exceeded more than once a year
d. Based on a 3-year average of annual 99th percentile values
e. Based on a 3-year average of annual 98th percentile values
ppm: parts per million; µg/m3: micrograms per cubic meter; mg/m3: milligrams per cubic meter

a. Monitored Air Quality

Air pollutant levels throughout Delaware are monitored by a network of sampling stations operated under the supervision of DNREC's Division of Air and Waste Management.

The closest monitoring stations to the project corridor are located in New Castle County at the Brandywine (O_3), Bellefonte ($PM_{2.5}$), Wilmington (CO, NO_2, PM_{10}, O_3, SO_2, $PM_{2.5}$), Summit Bridge (O_3, SO_2, $PM_{2.5}$), and Delaware City (CO, SO_2,) Monitoring Sites. The monitoring of $PM_{2.5}$ began in 1999 at the Bellefonte, Wilmington, and Summit Bridge monitoring sites and at a new monitoring site in Newark. However, the results of the $PM_{2.5}$ monitoring are in the process of being validated.

The highest levels reported for the Brandywine, Wilmington, Summit Bridge and Delaware City stations in 2004 are reported in ***Table III–26***. The levels do not exceed the S/NAAQS for all pollutants monitored, with the exception of O_3, which exceeded the 8-hour standard at the

Brandywine and Wilmington sites. There is no data for the monitoring of lead or TSP in Delaware.

Table III-26: Air Quality Summary for the Project Corridor
Delaware Air Quality Monitoring Sites Highest Recorded Levels During 2004

Pollutant	Brandywine	Wilmington	Summit Bridge	Delaware City
Carbon Monoxide (CO)				
1-Hour Maximum	---	3.6 ppm	---	1.8 ppm
Concentrations > 35 ppm	---	0	---	0
8-Hour Maximum	---	2.4 ppm	---	1.3 ppm
Concentrations > 9 ppm	---	0	---	0
Nitrogen Dioxide (NO_2)				
Annual Arithmetic Mean	---	0.019 ppm	---	---
Annual Mean > 0.05 ppm	---	0	---	---
Particulate Matter < 10 micrometers (PM_{10})				
24-Hour Average	---	70 µg /m^3	---	---
Concentrations > 150 µg/m^3	---	0	---	---
Annual Arithmetic Mean	---	20 µg /m^3	---	---
Annual Mean > 50 µg /m^3	---	0	---	---
Ozone (O_3)				
1-Hour Maximum	0.110 ppm	0.109 ppm	0.085 ppm	---
Concentrations > 0.12 ppm	0	0	0	---
8-Hour Maximum	0.094 ppm	0.094 ppm	0.075 ppm	---
Concentrations > 0.08 ppm	3	1	0	---
3-Year Average of 4th Daily Maximum Eight-Hour Average	0.089 ppm	0.086 ppm	0.084 ppm	
Sulfur Dioxide (SO_2)				
24-Hour Maximum	---	0.021 ppm	0.013 ppm	0.057 ppm
Concentrations > 0.14 ppm	---	0	0	0
3-Hour Maximum	---	0.049 ppm	0.037 ppm	0.127 ppm
Concentrations > 0.50 ppm	---	0	0	0
Annual Arithmetic Mean	---	0.005 ppm	0.004 ppm	0.006 ppm
Annual Mean > 0.03 ppm	---	0	0	0

Source: EPA AIRS Data Website: http://www.epa.gov/air/data/index.html

The project corridor is located in southern New Castle County, Delaware. The County is designated as in-attainment for carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb) and particulate matter (PM_{10}). However, New Castle County is designated as a non-attainment area for ozone (O_3) and fine particulate matter ($PM_{2.5}$). Since the project area is designated non-attainment for ozone, the region is subject to transportation control measures such as the Vehicle Emissions Inspections Program.

b. Conformance with Air Quality Standards

Under the requirements of the CAA, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act of 2005 (SAFETEA-LU), proposed transportation projects must be derived from a Constrained Long Range Transportation Plan (CLRP) that conforms with a state's air quality plans as outlined in a State Implementation Plan (SIP). The SIP sets forth an area's strategies for achieving and maintaining air quality standards.

The most recent air quality analysis applicable for the US 301 project was completed as part of the WILMAPCO *Year 2025 Regional Transportation Plan* (RTP) and its component air quality conformity analysis, as adopted by WILMAPCO's Council on March 6, 2003. A list of improvements to the US 301 corridor was included in and assumed to be in-service for the RTP's planning horizon years of 2005, 2015, and 2025.

The WILMAPCO Year 2025 RTP demonstrated conformity with the *State of Delaware 2005 State Implementation Plan* air quality budgets that were applicable at the time the RTP was adopted. These applicable budgets and the WILMAPCO RTP conformity analysis of March 2003 were developed and completed under the so-called "one-hour air quality standards" using EPA's MOBILE 5b emissions model. Note that the applicable budgets have since been updated under the "eight-hour air quality standards" using EPA's MOBILE 6.2 emissions model; subsequent air quality conformity analyses conducted in the Spring of 2005 for WILMAPCO's short range Transportation Improvement Program (TIP) indicated total emissions for New Castle County still conform to the Delaware SIP.

DelDOT is currently working with DNREC, WILMAPCO, FHWA, Federal Transit Administration (FTA), and EPA to address broader regional air quality issues for both ozone precursors and $PM_{2.5}$. WILMAPCO is scheduled to complete its next TIP conformity analyses and submit them for Federal agency review in late December 2006. WILMAPCO is scheduled to complete its next RTP conformity analyses and submit them for Federal agency review no later than March 2007. Following alternative selection, the project will need to be included in the conformity analysis, and programming of any funds for design, right-of-way or construction will be based on the results of that analysis.

In order for this project to conform to the SIP on a localized (or microscale) basis, an air quality analysis must be conducted that demonstrates that the project will not cause or exacerbate localized violations of the NAAQS. As stated previously, CO is the only criteria pollutant whose localized effects require a detailed impact evaluation.

4. Project Level Emissions Analysis (Microscale Analysis)

A detailed microscale air quality analysis has been performed to determine the local CO impact of the proposed project, as indicated in Section III.C.1. The analysis considered the impact of the No-Build, Yellow, Purple, Brown (North and South) and Green (North and South) Alternatives at 25 air quality receptors located throughout the project area and at two signalized intersections, each having 20 air quality receptors. The locations of air quality sensitive

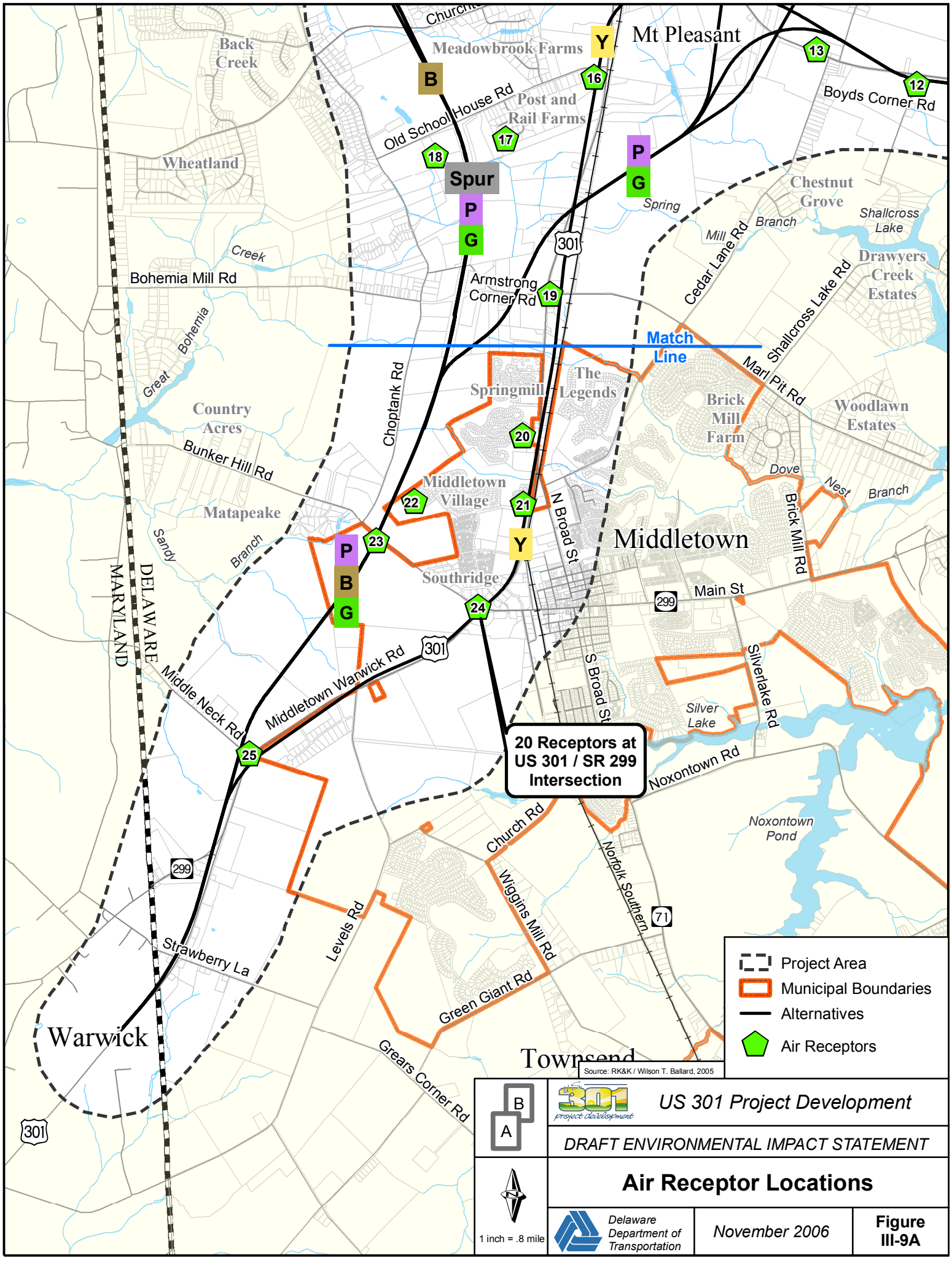
receptors used in the analysis are shown on ***Figure III-9*** and listed in ***Table III-27***. The results of the CO concentration analysis are summarized in the following sections.

Table III-27: Air Quality Receptor Locations

Receptor	Address/Location
R1	323 Jessica Drive
R2	318 John Randal Drive
R3	236 Oak Drive
R4	108 Laks Drive
R5	117 Delaware Canal Court East
R6	26 Meadow Lane
R7	523 Creek Lane East
R8	Victoria Drive Entrance
R9	1000 Jamison Corner Road
R10	864 Bullen Drive
R11	203 Milford Drive
R12	West of 404 Emerson Road
R13	Boyds Corner Road at Cedar Lane Road
R14	562 Boyds Corner Road
R15	US 301at Boyds Corner Road
R16	US 301at Old School House Road
R17	116 Saddle Drive
R18	Across from 830 Old School House Road
R19	US 301at Marl Pit Road
R20	US 301at Spring Mill
R21	US 301at Middletown Village
R22	828 Woodline Drive
R23	Across from 1106 Bunker Hill Road
R24	South of 1022 Bunker Hill Road
R25	1963 Middle Neck Road
299-1 thru 299-20	US 301at SR 299 Intersection
896-1 thru 896-20	US 301at SR 896 (Mount Pleasant) Intersection

a. Description of Impacts

The air quality analysis indicates that the carbon monoxide impact from the No-Build Alternative results in no violations of the State/National Ambient Air Quality Standards (S/NAAQS) 1-hour concentration or the 8-hour concentration at any air quality receptor location in any analysis year. The air quality analysis also indicates that carbon monoxide impacts resulting from the implementation of any of the build alternatives would not result in a violation of the 1-hour concentration or the 8-hour concentration, at any air quality receptor location, in any analysis year. The results of these analyses are presented in ***Tables III-28, III-29,*** and ***III-30***.


Mt Pleasant
Meadowbrook Farms
Back Creek
Wheatland
Old School House Rd
Post and Rail Farms
Boyds Corner Rd
Spur
Spring
Chestnut Grove
Shallcross Lake
Mill Branch
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Bohemia Mill Rd
Armstrong Corner Rd
Match Line
Marl Pit Rd
Woodlawn Estates
Brick Mill Farm
Springmill
The Legends
Choptank Rd
Country Acres
Bunker Hill Rd
Middletown Village
Dove Nest Branch
Brick Mill Rd
Matapeake
Middletown
N Broad St
Southridge
Main St
Sandy Branch
MARYLAND
DELAWARE
Middle Neck Rd
Middletown Warwick Rd
S Broad St
Silverlake Rd
Silver Lake
20 Receptors at US 301 / SR 299 Intersection
Noxontown Rd
Noxontown Pond
Church Rd
Norfolk Southern
Wiggins Mill Rd
Levels Rd
Strawberry La
Green Giant Rd
Grears Corner Rd
Warwick
Townsend
Project Area
Municipal Boundaries
Alternatives
Air Receptors
Source: RK&K / Wilson T. Ballard, 2005
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Air Receptor Locations
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-9A

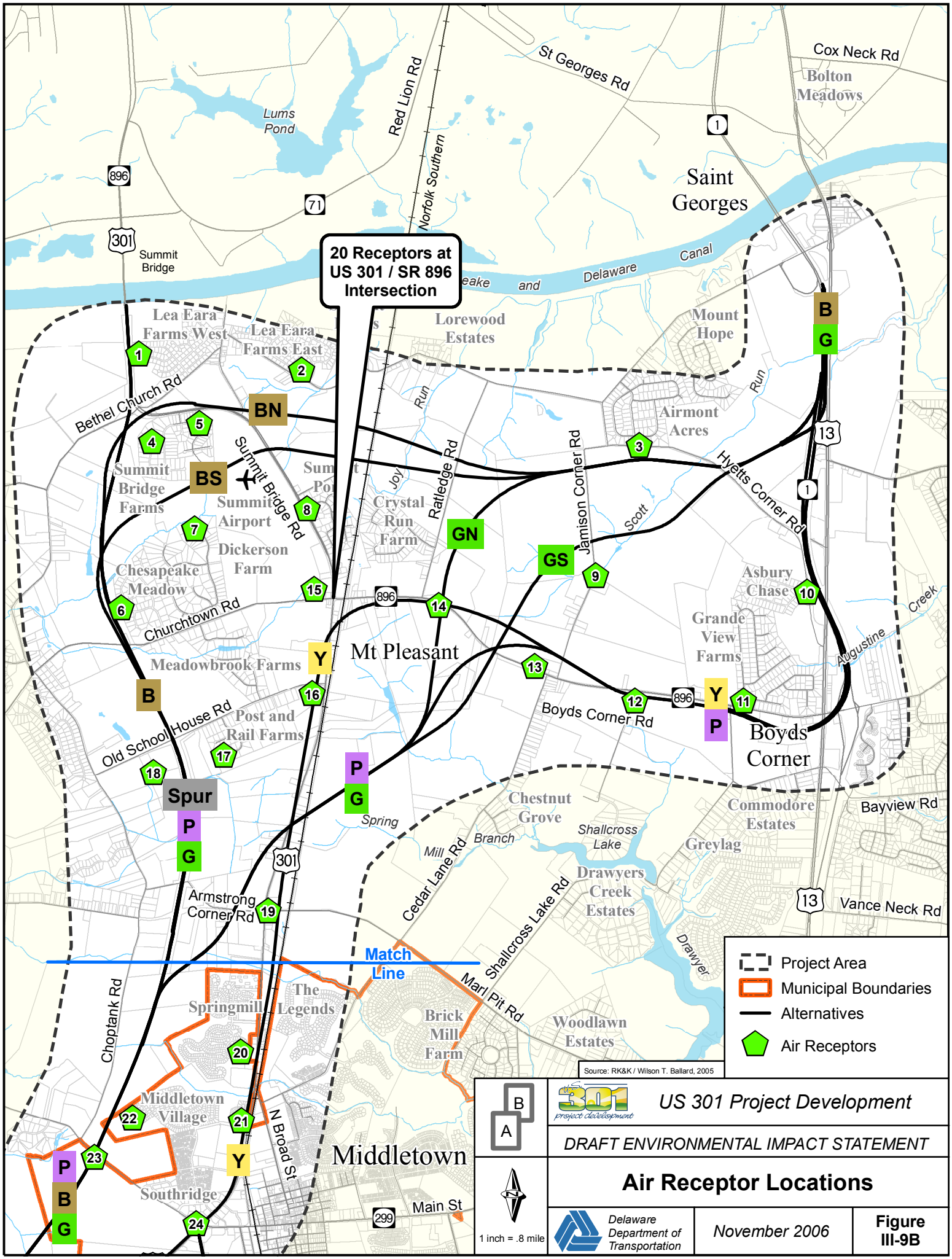

20 Receptors at US 301 / SR 896 Intersection
Saint Georges
St Georges Rd
Cox Neck Rd
Bolton Meadows
Lums Pond
Red Lion Rd
Norfolk Southern
Summit Bridge
Delaware Canal
Lea Eara Farms West
Lea Eara Farms East
Lorewood Estates
Mount Hope
Bethel Church Rd
Airmont Acres
Summit Bridge Farms
Summit Airport
Summit Bridge Rd
Crystal Run Farm
Ratledge Rd
Jamison Corner Rd
Hyetts Corner Rd
Dickerson Farm
Chesapeake Meadow
Churchtown Rd
Asbury Chase
Grande View Farms
Mt Pleasant
Meadowbrook Farms
Old School House Rd
Post and Rail Farms
Boyds Corner Rd
Boyds Corner
Augustine Creek
Spur
Chestnut Grove
Commodore Estates
Bayview Rd
Spring Mill Branch
Shallcross Lake
Greylag
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Vance Neck Rd
Armstrong Corner Rd
Match Line
Choptank Rd
Springmill
The Legends
Brick Mill Farm
Marl Pit Rd
Woodlawn Estates
Middletown Village
N Broad St
Middletown
Southridge
Main St
Project Area
Municipal Boundaries
Alternatives
Air Receptors
Source: RK&K / Wilson T. Ballard, 2005
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Air Receptor Locations
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-9B

Table III-28: Predicted CO Concentration, 2010

Receptor Number	No-Build		Yellow		Purple		Brown				Green			
							North		South		North		South	
	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
R1	3.2	1.9	2.9	1.8	3.2	1.8	3.2	1.8	3.2	1.8	3.0	1.8	3.0	1.8
R2	2.3	1.5	2.3	1.4	2.2	1.4	2.4	1.5	2.3	1.5	2.2	1.4	2.2	1.4
R3	2.0	1.3	2.0	1.3	2.0	1.3	2.4	1.5	2.4	1.5	2.5	1.6	2.2	1.4
R4	3.1	1.9	2.9	1.8	3.0	1.9	3.1	1.9	3.0	1.9	3.0	1.8	3.0	1.8
R5	2.6	1.7	2.4	1.6	2.6	1.7	2.9	1.8	2.7	1.7	2.5	1.6	2.5	1.6
R6	2.2	1.4	2.1	1.4	2.2	1.4	2.8	1.7	2.8	1.7	2.1	1.4	2.1	1.4
R7	2.3	1.5	2.2	1.4	2.3	1.5	2.4	1.5	2.4	1.5	2.2	1.4	2.2	1.4
R8	3.6	2.0	3.7	2.1	3.2	1.9	3.2	1.9	3.2	1.9	3.1	1.9	3.1	1.9
R9	2.0	1.3	2.0	1.3	2.2	1.3	2.1	1.3	2.1	1.3	2.2	1.4	2.3	1.5
R10	4.8	2.7	4.5	2.4	4.5	2.4	4.4	2.4	4.4	2.4	4.4	2.4	4.4	2.4
R11	2.6	1.6	2.4	1.6	2.4	1.5	2.4	1.6	2.4	1.6	2.3	1.5	2.3	1.5
R12	2.6	1.6	3.2	1.9	3.4	2.0	2.4	1.6	2.4	1.6	2.4	1.5	2.4	1.5
R13	3.3	1.9	3.3	1.9	3.0	1.9	3.0	1.7	3.0	1.7	2.8	1.7	2.8	1.7
R14	2.9	1.7	3.5	2.1	2.6	1.6	2.5	1.5	2.5	1.5	2.7	1.6	2.6	1.6
R15	4.6	2.7	5.1	2.9	4.6	2.7	4.7	2.7	4.7	2.7	4.4	2.5	4.4	2.5
R16	3.7	2.1	3.9	2.2	2.8	1.8	2.7	1.7	2.7	1.7	2.7	1.7	2.7	1.7
R17	2.0	1.3	2.1	1.3	3.3	1.9	2.7	1.6	2.7	1.6	3.4	1.9	3.4	1.9
R18	2.0	1.3	2.0	1.3	2.3	1.4	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5
R19	2.5	1.6	2.6	1.6	2.3	1.5	2.2	1.5	2.2	1.5	2.3	1.5	2.3	1.5
R20	2.3	1.5	2.3	1.5	2.1	1.3	2.2	1.4	2.2	1.4	2.1	1.3	2.1	1.3
R21	3.3	1.9	2.9	1.7	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5
R22	2.0	1.3	1.9	1.3	2.9	1.7	3.0	1.7	3.0	1.7	2.9	1.8	2.9	1.8
R23	1.9	1.3	1.9	1.3	6.1	3.3	6.3	3.4	6.3	3.4	6.3	3.5	6.3	3.5
R24	2.9	1.8	2.7	1.7	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5
R25	2.5	1.6	2.5	1.6	2.6	1.7	2.7	1.7	2.7	1.7	2.7	1.7	2.7	1.7

Notes: Maximum 1-hr. CO concentrations include 1.7 ppm background level. Worst-case (AM orPM) shown.
Maximum 8-hr. CO concentrations include 1.2 ppm background level.
The S/NAAQS for the maximum 1-hr. CO concentration is 35.0 ppm.
The S/NAAQS for the maximum 8-hr. average CO concentration is 9.0 ppm.

Indicated background levels (1.7 ppm and 1.2 ppm for 1-hour and 8-hour concentrations, respectively) represent those levels listed on the EPA AIRS website that are closest and most representative of ambient conditions for the project area and were derived from the Delaware City monitoring site.

Table III-29: Predicted CO Concentration, 2030

Receptor Number	No-Build		Yellow		Purple		Brown				Green			
							North		South		North		South	
	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
R1	2.7	1.7	2.5	1.6	2.7	1.6	2.7	1.7	2.7	1.6	2.5	1.6	2.5	1.6
R2	2.1	1.4	2.1	1.4	2.1	1.4	2.2	1.4	2.1	1.4	2.1	1.4	2.1	1.4
R3	2.0	1.3	1.9	1.3	1.9	1.3	2.3	1.4	2.3	1.4	2.4	1.5	2.1	1.3
R4	2.7	1.7	2.6	1.6	2.6	1.7	2.7	1.7	2.6	1.7	2.6	1.6	2.6	1.6
R5	2.3	1.5	2.2	1.5	2.3	1.5	2.4	1.6	2.3	1.5	2.2	1.5	2.2	1.5
R6	2.1	1.4	2.0	1.3	2.1	1.4	2.6	1.6	2.6	1.5	2.0	1.3	2.0	1.3
R7	2.2	1.4	2.1	1.4	2.2	1.4	2.2	1.4	2.3	1.4	2.1	1.4	2.1	1.4
R8	3.1	1.8	3.1	1.8	2.9	1.7	2.9	1.7	2.9	1.7	2.7	1.7	2.7	1.7
R9	2.0	1.3	1.9	1.3	1.9	1.3	2.0	1.3	2.0	1.3	2.0	1.3	2.2	1.4
R10	4.0	2.3	3.7	2.1	3.7	2.1	3.7	2.1	3.7	2.1	3.6	2.1	3.6	2.1
R11	2.3	1.5	2.2	1.5	2.2	1.4	2.3	1.5	2.3	1.5	2.2	1.5	2.2	1.5
R12	2.4	1.5	2.9	1.8	2.9	1.8	2.4	1.5	2.4	1.5	2.1	1.4	2.1	1.4
R13	2.9	1.7	2.9	1.7	2.8	1.7	2.7	1.6	2.7	1.6	2.6	1.5	2.6	1.5
R14	2.5	1.6	3.0	1.9	2.3	1.5	2.2	1.5	2.2	1.5	2.3	1.5	2.3	1.5
R15	3.8	2.3	4.2	2.5	3.8	2.3	3.9	2.3	3.9	2.3	3.7	2.2	3.7	2.2
R16	3.0	1.8	3.2	2.0	2.5	1.6	2.5	1.6	2.5	1.6	2.5	1.6	2.5	1.6
R17	1.9	1.3	1.9	1.3	2.7	1.7	2.4	1.5	2.4	1.5	2.8	1.7	2.8	1.7
R18	1.8	1.3	1.8	1.3	2.1	1.4	2.1	1.4	2.1	1.4	2.1	1.4	2.1	1.4
R19	2.3	1.5	2.4	1.5	2.2	1.4	2.1	1.4	2.1	1.4	2.2	1.4	2.2	1.4
R20	2.1	1.4	2.0	1.4	1.9	1.3	2.0	1.3	2.0	1.3	2.0	1.3	2.0	1.3
R21	2.6	1.7	2.5	1.5	2.2	1.4	2.2	1.4	2.2	1.4	2.1	1.4	2.1	1.4
R22	1.8	1.2	1.8	1.2	2.4	1.6	2.5	1.6	2.5	1.6	2.5	1.6	2.5	1.6
R23	1.9	1.2	1.8	1.2	5.0	2.8	5.2	2.9	5.2	2.9	5.2	2.9	5.2	2.9
R24	2.6	1.7	2.4	1.6	2.1	1.4	2.1	1.4	2.1	1.4	2.1	1.4	2.1	1.4
R25	2.5	1.5	2.2	1.5	2.4	1.5	2.4	1.5	2.4	1.5	2.4	1.6	2.4	1.6

Maximum 1-hr. CO concentrations include 1.7 ppm background level. Worst-case (AM orPM) shown.
Maximum 8-hr. CO concentrations include 1.2 ppm background level.
The S/NAAQS for the maximum 1-hr. CO concentration is 35.0 ppm.
The S/NAAQS for the maximum 8-hr. average CO concentration is 9.0 ppm.

Table III-30: CO Concentration at Signalized Intersections (ppm)

US 301 at SR 299									US 301 at SR 896								
Receptor Number	2010				2030				Receptor Number	2010				2030			
	No-Build		Build		No-Build		Build			No-Build		Build		No-Build		Build	
	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.		1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
299-1	4.8	3.1	3.5	2.4	4.1	2.6	3.0	2.0	896-1	4.8	2.7	4.2	2.4	3.9	2.3	3.4	2.1
299-2	5.1	3.1	3.5	2.1	4.2	2.6	3.0	1.9	896-2	4.8	2.8	4.2	2.5	3.9	2.3	3.5	2.1
299-3	5.1	3.2	3.9	2.5	4.1	2.7	3.3	2.1	896-3	5.4	3.0	5.0	2.5	4.3	2.6	4.1	2.2
299-4	5.0	3.2	4.0	2.6	4.2	2.7	3.5	2.2	896-4	5.2	3.0	4.6	2.6	4.3	2.6	3.8	2.2
299-5	4.5	2.8	3.0	1.9	3.8	2.4	2.9	1.7	896-5	5.5	3.1	5.1	2.6	4.4	2.6	4.1	2.2
299-6	4.6	2.9	3.3	2.1	3.9	2.5	2.9	1.8	896-6	5.3	3.1	4.8	2.6	4.4	2.6	4.0	2.3
299-7	3.7	2.2	2.8	1.7	3.1	2.0	2.5	1.6	896-7	4.8	2.8	4.4	2.5	4.0	2.4	3.7	2.1
299-8	3.6	2.3	2.9	1.8	3.1	2.0	2.5	1.7	896-8	5.3	2.9	4.6	2.6	4.2	2.5	3.8	2.2
299-9	4.1	2.4	3.0	1.8	3.4	2.0	2.7	1.6	896-9	5.1	2.7	4.6	2.2	4.1	2.3	3.8	1.9
299-10	4.4	2.7	3.3	2.1	3.5	2.3	2.9	1.9	896-10	4.7	2.5	4.1	2.0	4.0	2.2	3.6	1.8
299-11	4.2	2.9	3.5	2.1	3.5	2.4	2.9	1.9	896-11	4.8	2.6	4.2	2.1	3.9	2.2	3.5	1.8
299-12	4.0	2.5	3.1	1.9	3.4	2.1	2.8	1.7	896-12	5.1	2.8	4.6	2.3	4.0	2.3	3.7	1.9
299-13	3.8	2.6	3.1	2.0	3.3	2.2	2.7	1.8	896-13	4.6	2.8	4.2	2.4	3.8	2.3	3.5	2.1
299-14	4.4	2.7	3.4	2.1	3.8	2.3	2.9	1.8	896-14	4.4	2.7	4.0	2.4	3.7	2.3	3.3	2.1
299-15	4.5	2.9	3.6	2.3	3.7	2.5	3.1	2.0	896-15	4.8	2.8	4.4	2.6	4.1	2.5	3.7	2.2
299-16	4.3	2.9	3.4	2.3	3.6	2.5	3.0	1.9	896-16	5.1	2.9	4.6	2.6	4.2	2.5	3.7	2.2
299-17	5.0	3.0	3.8	2.2	4.2	2.6	3.4	2.0	896-17	4.7	2.6	4.2	2.2	3.9	2.2	3.6	1.9
199-18	4.0	2.4	2.9	1.8	3.4	2.1	2.6	1.7	896-18	4.6	2.5	3.9	2.1	3.8	2.2	3.3	1.9
299-19	4.9	2.8	3.0	1.9	3.8	2.4	2.7	1.7	896-19	4.5	2.6	4.1	2.2	3.7	2.3	3.5	1.9
299-20	4.9	2.9	3.2	2.0	4.2	2.5	2.9	1.8	896-20	4.4	2.5	3.9	2.1	3.8	2.2	3.3	1.8

The worst-case (AM or PM) Build scenario is shown.
Maximum 1-hr. CO concentrations include 1.7 ppm background level.
Maximum 8-hr. CO concentrations include 1.2 ppm background level.

The S/NAAQS for the maximum 1-hr. CO concentration is 35.0 ppm.
The S/NAAQS for the maximum 8-hr. average CO concentration is 9.0 ppm.

b. Consequences and Potential Mitigation

A relative comparison of the No-Build Alternative to the build alternatives shows that CO concentrations generally remain the same. There are slight increases or decreases in CO concentrations that can be attributed to shifts in the roadway alignments and altered traffic patterns on existing and proposed roadways. Increases are typically seen at receptors that are located near a proposed alignment that are currently located away from major roadways. Differences in CO concentrations at receptors range from 0 to 4.4 ppm. Reductions in CO concentration are typically seen at receptors adjacent to existing roadways that are projected to facilitate less traffic volume when the proposed alignment is constructed. Reductions typically range from 0 to 1.9 ppm.

D. Noise

This section details the evaluation of potential noise impacts caused by the US 301 project. Following a discussion of noise/activity relationships, a summary is presented of existing noise conditions and development of projected noise that may result upon implementation of a build alternative. Impacts to noise sensitive receptors are identified, and potential mitigation for impacts is discussed.

The Federal Highway Administration (FHWA) has issued guidelines for noise evaluation as established in Title 23 of the Code of Federal Regulations (CFR) Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. Highway traffic noise studies, noise abatement procedures, coordination requirements and design noise levels in CFR Part 772 constitute the noise standards mandated by 23 U.S.C. 109(i). Design noise levels for various types of activity (land use) categories are summarized in the following section.

1. Existing Conditions

a. Criteria for Determining Noise Impacts

To describe noise environments and to assess impact on noise sensitive areas, a frequency weighting measure that simulates human subjective response to noise is customarily selected. A-weighted ratings of noise sources which reflect the human ear's reduced sensitivity to low frequencies have been found to correlate strongly with human perceptions of the annoying aspects of noise, particularly from traffic noise sources. Consequently A-weighted noise levels, described in decibels-A (dBA), are the values cited by FHWA in its noise criteria indicated in ***Table III-31***.

Most environmental noise fluctuates from moment to moment. To correlate noise environments with community annoyance, a single-number noise descriptor called the equivalent sound level (L_{eq}), which characterizes the fluctuating sound, is commonly used. The L_{eq} is the value or level of a steady, non-fluctuating sound that represents the same amount of acoustical energy over the

same period of time. For traffic noise assessment, L_{eq} is typically evaluated over a one-hour period, $L_{eq}(h)$.

The design noise levels indicated in ***Table III-31*** have been used to determine highway traffic noise impacts and the need for considering abatement measures associated with different land uses or activities in existence at the time of project design. Noise-sensitive land uses potentially affected by the proposed improvements are in activity categories B and C. The following Noise Abatement Criteria (NAC) are applicable: L_{eq} equals 67 dBA (exterior) for residential areas, churches, schools etc. where outdoor activity is present, and L_{eq} equals 72 dBA (exterior) for industrial areas. When the predicted design-year build alternative noise levels in the project area approach or exceed the NAC, noise impact occurs, and consideration of traffic noise reduction measures is necessary.

Table III-31: FHWA Noise Abatement Criteria/Activity Relationships

Activity Category	Design Noise Level Leq(h)	Description of Activity Category
A	57 dBA (Exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 dBA (Exterior)	Residences, motels, hotels, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	72 dBA (Exterior)	Developed lands, properties or activities not included in categories A and B above.
D	--	Undeveloped lands.
E	52 dBA (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

In December 1993, the FHWA issued a memorandum to provide guidance on interpreting the word "approach" in section 772.5(g) of 23 CFR. The FHWA defined noise levels that "approach" the noise abatement criteria to be 1 dBA less than the Noise Abatement Criteria.

Criteria adopted by DelDOT for the determination of an impacted receptor under the State Noise Abatement Policy are summarized as follows:

- Loudest hour L_{eq} A-weighted noise levels.
- Design year noise levels approach or exceed the NAC levels.
- Design year noise levels substantially exceed existing noise levels (10 dBA or more).

b. Analysis Procedures and Methodology

This analysis was conducted in accordance with standard FHWA guidelines and current DelDOT procedures and policies. The analysis began with the determination of existing noise levels along the project corridor in order to assess the traffic noise contributions on the neighboring

noise sensitive areas. Future proposed design year 2030 alternatives noise calculations and predictions were performed using FHWA-approved methods. The noise predictions were performed with the FHWA Traffic Noise Model (TNM) version 2.5 (FHWA-PD-96-009). The model incorporates vehicle noise emission levels, updated for modern vehicle classification, traffic speed and traffic volume, sound propagation factors from atmospheric absorption, divergence, intervening ground, intervening barriers, intervening rows of buildings and areas of heavy vegetation.

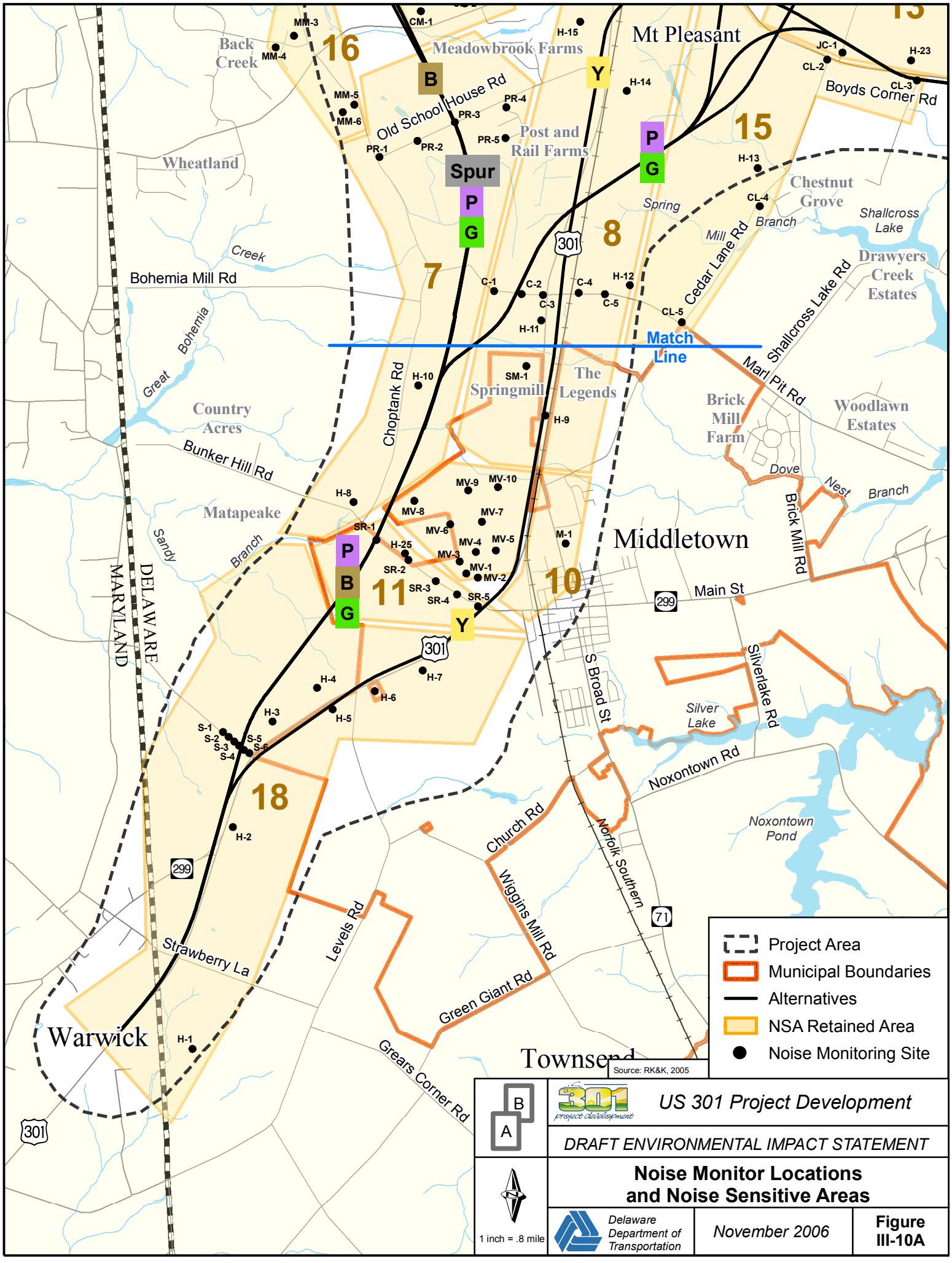
c. Measured and Predicted Existing Noise Levels

In order to determine the existing noise characteristics within the project corridor, ambient noise measurements were recorded in the field during July and August 2005. Short-term ambient noise measurements of 15 minutes were conducted at each noise sensitive area as shown in ***Figure III-10*** and on the figures in **Appendix B**.

A Noise Sensitive Area (NSA) represents a community of properties (receptors) that could be impacted by traffic noise resulting from the proposed roadway alignments. The NSA could consist of residences, historic properties, schools, churches and other facilities with common outdoor use areas (refer to ***Table III-31***, Activity Category B). Several noise monitors were placed in each NSA for a specific period of time, including peak and non-peak periods, in order to establish an accurate representation of the noise environment.

Where appropriate, monitors were positioned in an array configuration to provide a representation of noise levels perpendicular to the mainline traffic source. This allows the ability to interpolate noise levels between receptor sites. Additionally, this array configuration provides sufficient noise information to allow the projection of noise levels along the mainline corridor (where terrain features are similar) to represent other properties within the NSA.

Table III-32 shows measured ambient and predicted peak noise data in one-hour equivalent sound levels (L_{eq}). Predicted noise levels were calculated to 0.1 dBA and then rounded to the nearest whole integer.


Mt Pleasant
Meadowbrook Farms
Back Creek
Wheatland
Post and Rail Farms
Spur
Old School House Rd
Boyds Corner Rd
Chestnut Grove
Shallcross Lake
Drawyers Creek Estates
Cedar Lane Rd
Shallcross Lake Rd
Marl Pit Rd
Bohemia Mill Rd
Bohemia
Great
Creek
Spring
Mill
Branch
Match Line
The Legends
Springmill
Choptank Rd
Brick Mill Farm
Woodlawn Estates
Country Acres
Bunker Hill Rd
Matapeake
Sandy
Branch
Dove
Nest
Brick Mill Rd
Middletown
Main St
S Broad St
Silverlake Rd
Silver Lake
Noxontown Rd
Noxontown Pond
Church Rd
Norfolk Southern
Wiggins Mill Rd
Levels Rd
Strawberry La
Green Giant Rd
Grears Corner Rd
Townsend
Warwick
MARYLAND
DELAWARE
16
15
8
7
11
10
18
301
299
71
Project Area
Municipal Boundaries
Alternatives
NSA Retained Area
Noise Monitoring Site
Source: RK&K, 2005
1 inch = .8 mile
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Noise Monitor Locations and Noise Sensitive Areas
Delaware Department of Transportation
November 2006
Figure III-10A

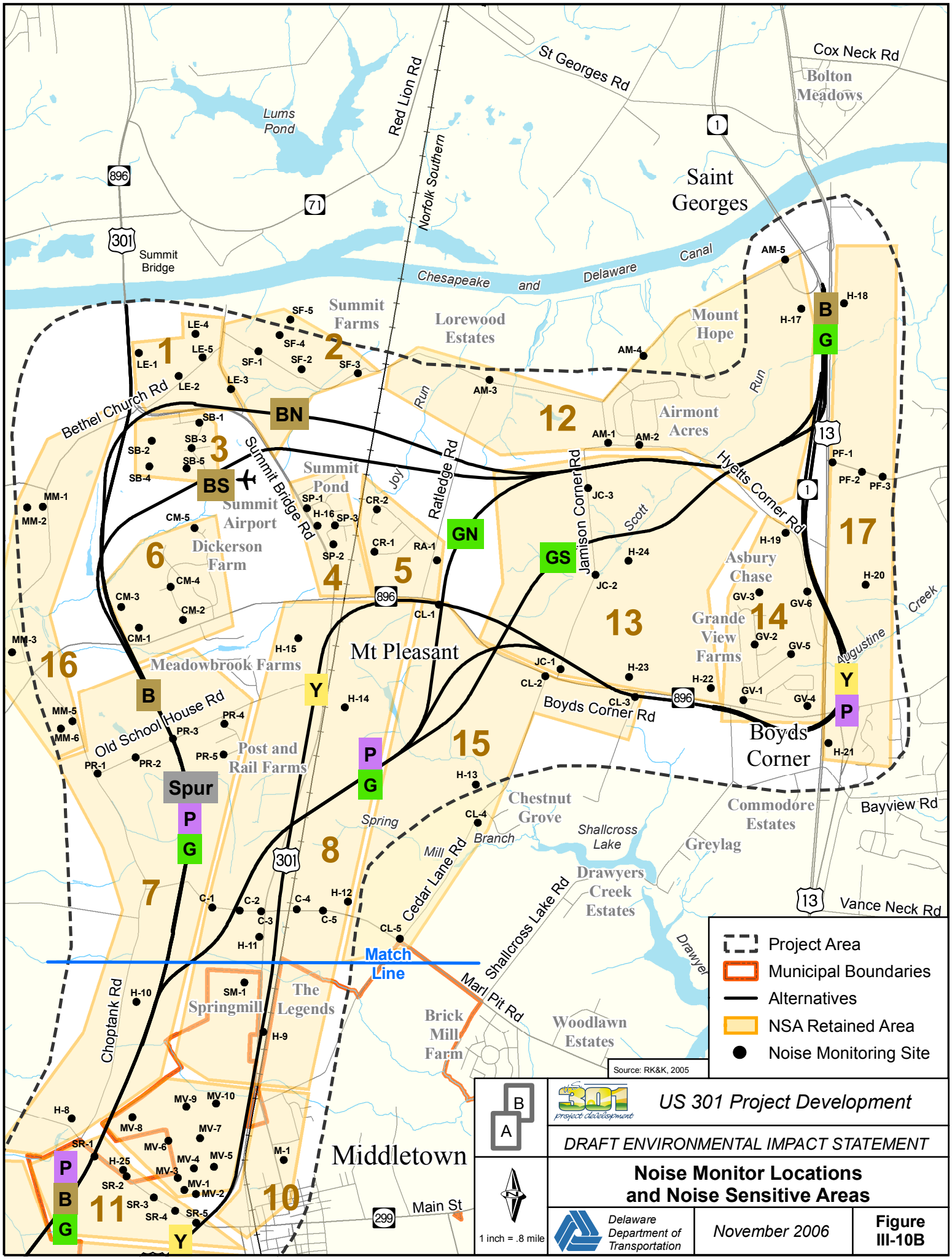

Lums Pond
Red Lion Rd
St Georges Rd
Cox Neck Rd
Bolton Meadows
Saint Georges
Norfolk Southern
Summit Bridge
Chesapeake and Delaware Canal
Lorewood Estates
Summit Farms
Mount Hope
Bethel Church Rd
Summit Bridge Rd
Summit Airport
Summit Pond
Airmont Acres
Ratledge Rd
Jamison Corner Rd
Hyetts Corner Rd
Dickerson Farm
Asbury Chase
Grande View Farms
Meadowbrook Farms
Mt Pleasant
Old School House Rd
Post and Rail Farms
Boyds Corner Rd
Boyds Corner
Chestnut Grove
Commodore Estates
Bayview Rd
Shallcross Lake
Greylag
Drawyers Creek Estates
Cedar Lane Rd
Shallcross Lake Rd
Vance Neck Rd
Match Line
Choptank Rd
Springmill
The Legends
Brick Mill Farm
Marl Pit Rd
Woodlawn Estates
Middletown
Main St
Augustine Creek
Run
Spring Mill Branch
Joy Run
Scott Run
Project Area
Municipal Boundaries
Alternatives
NSA Retained Area
Noise Monitoring Site
Source: RK&K, 2005
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Noise Monitor Locations and Noise Sensitive Areas
1 inch = .8 mile
Delaware Department of Transportation
November 2006
Figure III-10B

Table III-32: Existing Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Name	Address	Location Notes	Measured Ambient Leq (dBA)	Existing Peak Hour Leq (dBA)
1	LE-1	Lea Eara Farms	323 Jessica Dr.		57	59
	LE-2	Lea Eara Farms	106 W. Cedarwood Dr.		49	50
	LE-3	Lea Eara Farms	669 Old Summit Bridge Rd.		57	57
	LE-4	Lea Eara Farms	421 Maplewood Dr.		45	45
	LE-5	Lea Eara Farms	121 E. Cedarwood Dr.		45	47
2	SF-1	Summit Farms	Lorewood Grove Rd.	Across from 1520 Lorewood Grove Rd.	56	56
	SF-2	Summit Farms	318 John Randal Dr.		46	46
	SF-3	Summit Farms	1370 Lorewood Grove Rd.		47	47
	SF-4	Summit Farms	210 Sheats Ln.		50	50
	SF-5	Summit Farms	224 Sheats Ln.		48	46
	H-26	S. Rothwell House	669 Old Summit Bridge Rd.		--	58
3	SB-1	Summit Bridge Farms	117 Delaware Canal Ct. E		50	54
	SB-2	Summit Bridge Farms	108 Laks Dr.		48	53
	SB-3	Summit Bridge Farms	133 Delaware Canal Ct. E		45	47
	SB-4	Summit Bridge Farms	120 Laks Dr.		41	46
	SB-5	Summit Bridge Farms	138 Delaware Canal Ct. E		43	43
4	SP-1	Summit Pond	Victoria Dr. Entrance		72	72
	SP-2	Summit Pond	911 Waterlilly Ln.		50	52
	SP-3	Summit Pond	720 Victoria Dr.		46	50
	H-16	A. Eliason House; Twin Holly Farms	4353 Summit Bridge Rd		--	70
5	BC-1	Boyds Corner at US 301			--	68
	CR-1	Crystal Run Farm	226 Waterford Dr.		47	47
	CR-2	Crystal Run Farm	135 Crystal Run Dr.		39	38
	RA-1	Ratledge Road	450 Ratledge Road		--	(46)

NOTES: *Shading indicates existing receptor is impacted (66 dBA or higher).*
-- indicates receptor level is peak calculated-only.
(46) Indicates value was calculated using comparable receptors in the area.

Table III-32: Existing Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Name	Address	Location Notes	Measured Ambient Leq (dBA)	Existing Peak Hour Leq (dBA)
6	CM-1	Chesapeake Meadow	208 Deerfield Dr.		47	47
	CM-2	Dickerson Farm	600 Schoonover Ln.		51	51
	CM-3	Chesapeake Meadow	26 Meadow Ln.		47	47
	CM-4	Dickerson Farm	313 W. Dickerson Lane		51	51
	CM-5	Dickerson Farm	523 E. Creek Ln.		49	49
7	BH-1	Bohemia Mill Road West	1203 Sharp Ln.		--	60
	MA-1	Matapeake	100 Sassafras Dr.		--	43
	PR-1	Post and Rail Farms	1542 Choptank Rd.		58	58
	PR-2	Post and Rail Farms	1620 Choptank Rd.		54	54
	PR-3	Post and Rail Farms	830 Old School House Rd.		52	52
	PR-4	Post and Rail Farms	102 Saddle Dr.		51	51
	PR-5	Post and Rail Farms	116 Saddle Dr.		47	47
	H-8	Rosedale; Mary Del Farm	1143 Bunker Hill Rd		--	(46)
	H-10	S. Holton Farm	2010 Choptank Rd		--	46
	H-28	Choptank; J. Clayton Farm	1542 Choptank Rd.		--	(46)
8	C-1	n/a	416 Armstrong Corner Rd.		54	54
	C-2	n/a	5036 Summit Bridge Rd.		62	62
	C-3	n/a	5036 Summit Bridge Rd.		64	69
	C-4	n/a	617 Marl Pit Rd.		59	59
	C-5	n/a	617 Marl Pit Rd.		--	43
	LG-1	The Legends West	10 Couples Ct.		--	53
	OS-1	Old Schoolhouse Rd. at US 301	626 Old Schoolhouse Rd.		--	48
	SM-1	Springmill	Carter Dr.	Open space around 201 Carter Dr.	57	57
	SM-2	Springmill	Windmill Lane		--	62

NOTES: *Shading indicates existing receptor is impacted (66 dBA or higher).*
-- indicates receptor level is peak calculated-only.
(46) Indicates value was calculated using comparable receptors in the area.

Table III-32: Existing Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Name	Address	Location Notes	Measured Ambient Leq (dBA)	Existing Peak Hour Leq (dBA)
8	SM-3	Springmill	Whispering Trail		--	55
	SM-4	Springmill	Daylily Way		--	41
	SM-5	Springmill	Springmill Drive		--	35
	H-9	R.G. Hayes House	5187 Summit Bridge Rd.		--	66
	H-11	Armstrong-Walker House; J. Cox Estate	5036 Summit Bridge Rd.		--	67
	H-12	Achmester	North Side of Marl Pit Rd.	One mile east of Summit Bridge Rd.	--	(46)
	H-14	Weston; S. Brady Farm	4677 Summit Bridge Rd.		--	51
	H-15	Mt. Pleasant Farm	4564 Summit Bridge Rd.		--	48
9	MV-1	Middletown Village	Liborio Dr.	Next to 203 Liborio Dr.	--	47
	MV-2	Middletown Village	112 Sandhill Rd.		58	58
	MV-3	Middletown Village	110 Sleepy Hollow Dr.		50	50
	MV-4	Middletown Village	766 Marian Dr.		62	62
	MV-5	Middletown Village	Peterson Rd.	Across from 333 Liborio Dr.	55	55
	MV-6	Middletown Village	1106 Bunker Hill Rd.		50	50
	MV-7	Middletown Village	Ash Blvd.	Across from 324 Vincent Circle.	51	51
	MV-8	Middletown Village	828 Woodline Dr.		45	45
	MV-9	Middletown Village	Ash Blvd.	Open space behind Dove Nest Ct.	--	44
	MV-10	Middletown Village	334 E. Harvest Ln.		56	56
	MV-11	Middletown Village	125 Foxtail Ln.		--	57
10	M-1	Middletown	691 Broad St.		54	54

NOTES: *Shading indicates existing receptor is impacted (66 dBA or higher).*
-- indicates receptor level is peak calculated-only.
(46) Indicates value was calculated using comparable receptors in the area.

Table III-32: Existing Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Name	Address	Location Notes	Measured Ambient Leq (dBA)	Existing Peak Hour Leq (dBA)
11	A-1	Appoquinimink High School	1080 Bunker Hill Road		--	46
	SO-1	Southridge	15 Palisade Circle		--	46
	SR-1	n/a	Bunker Hill Rd.	Across from 1106 Bunker Hill Rd.	--	40
	SR-2	n/a	1106 Bunker Hill Rd.		64	64
	SR-3	n/a	Bunker Hill Rd.	Across from 441 Toftrees Dr.	61	61
	SR-4	n/a	Bunker Hill Rd.	Across from 122 Sandhill Dr.	62	62
	SR-5	n/a	Bunker Hill Rd.	South of 1022 Bunker Hill Rd.	61	68
	H-25	The Maples; George Derrickson House	North Side of Bunker Hill Rd.	0.6 miles NW of Middletown Warwick Rd.	64	60
12	AM-1	Airmont Acres	502 Davis Ct.		52	52
	AM-2	Airmont Acres	236 Oak Dr.		51	51
	AM-3	n/a	Lorewood Grove / Ratledge	Across from 1166 Lorewood Grove Rd.	48	48
	AM-4	Airmont Acres	784 Lorewood Grove Rd.		66	66
	AM-5	n/a	Lorewood Grove Rd.	Across from 1871 S. Dupont Hwy.	68	68
	SG-1	St. Georges Technical High School	555 Hyetts Corner Rd.		--	51
	H-17	Old Ford Dairy (NOT Eligible)	West Side of Rt. 13	1.0 miles south of St. Georges Bridge	--	56
13	JC-1	n/a	Boyds Corner Rd.	Across from 1131 Jamison Corner Rd.	51	51
	JC-2	n/a	1000 Jamison Corner Rd.		49	49
	JC-3	n/a	Jamison Corner Rd.	Across from 100 Scott Run Blvd.	51	51
	JC-4		1075 Jamison Corner Rd.		--	43
	H-22	S.F. Shallcross House	1049 Boyds Corner Rd.		--	55
	H-23	Mrs. Cleavers House (NOT Eligible)	915 Boyds Corner Rd.		--	54
	H-24	J. Houston House	1000 Jamison Corner Rd.		--	49

NOTES: *Shading indicates existing receptor is impacted (66 dBA or higher).*
-- indicates receptor level is peak calculated-only.
(46) Indicates value was calculated using comparable receptors in the area.

Table III-32: Existing Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Name	Address	Location Notes	Measured Ambient Leq (dBA)	Existing Peak Hour Leq (dBA)
14	GV-1	Grande View Farms	203 Milford Dr.		57	57
	GV-2	Grande View Farms	258 Milford Dr.		55	55
	GV-3	Grande View Farms	203 Red Fox Ct.		47	47
	GV-4	Grande View Farms	149 Jane Ct.		56	56
	GV-5	Grande View Farms	320 Hyetts Corner Rd.		52	52
	GV-6	Grande View Farms	864 Bullen Dr.		62	62
	H-19	"Fairview"; A.H. Diehl House	350 Hyetts Corner Rd.		--	58
15	CL-1	n/a	562 Boyds Corner Rd.		69	69
	CL-2	Cedar Lane Elementary and Middle Schools	1259 Cedar Lane Rd.		68	68
	CL-3	n/a	Emerson Rd.	West of 404 Emerson Rd.	57	57
	CL-4	Chestnut Grove	201 Chestnut Way		51	51
	CL-5	n/a	617 Marl Pit		65	65
	CL-6	Cedar Lane Elementary and Middle Schools	1235 Cedar Lane		--	60
	H-13	Lovett Farm/Mrs. Templeman House	1405 Cedar Lane Rd.		--	(46)
	H-29	T. J. Houston House	1309 Cedar Lane Rd.		--	(46)
	SA-1	Cedar Lane Elementary School	1235 Cedar Lane Rd.		--	64
16	MM-1	Biggs Farm	Bethel Church Rd.	North of 1151 Choptank Rd.	--	57
	MM-2	Biggs Farm	Bethel Church Rd.	North of 1151 Choptank Rd.	--	42
	MM-3	Back Creek	105 Joshua Ct.		--	49
	MM-4	Back Creek	103 Saint Andrews Ct.		--	38
	MM-5	Fox Hunter Crossing	116 Senator Dr.		--	62
	MM-6	Fox Hunter Crossing	116 Colonel Clayton Dr.		--	44
	H-27	Woodside	1370 Choptank Rd.		--	58
	H-31	Gov. Benjamin Biggs Farm	1196 Choptank Rd.		--	47

NOTES: *Shading indicates existing receptor is impacted (66 dBA or higher).*
-- indicates receptor level is peak calculated-only.
(46) Indicates value was calculated using comparable receptors in the area.

Table III-32: Existing Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Name	Address	Location Notes	Measured Ambient Leq (dBA)	Existing Peak Hour Leq (dBA)
17	PF-1	Penfield Farms	2106 S. Dupont Hwy. N		61	61
	PF-2	Penfield Farms	S. Dupont Hwy. N	East of 336 Port Penn Rd.	57	57
	PF-3	Penfield Farms	381 Port Penn Road		62	62
	H-18	Idalia Manor; Mrs. M.A. Osborne	1870 S. Dupont Highway		--	59
	H-20	Retirement Farm	2256 Dupont Hwy N		--	49
	H-21	J.M. Vandergrift House; Elm Grange	2424 S. Dupont Highway		--	64
18	S-1	n/a	1963 Middle Neck Rd.		58	58
	S-2	n/a	1963 Middle Neck Rd.		50	50
	S-3	n/a	1963 Middle Neck Rd.		60	60
	S-4	n/a	1963 Middle Neck Rd.		--	54
	S-5	n/a	1963 Middle Neck Rd.		57	59
	S-6	n/a	1963 Middle Neck Rd.		--	68
	H-1	Shahan Farm, Lanape Acres	389 Strawberry Ln.		--	(46)
	H-2	B.F. Hanson House	1102 Middletown Warwick Rd.		--	61
	H-3	C. Polk House Estate	929 Middletown Warwick Rd.		--	56
	H-4	Rumsey Farm	841 Middletown Warwick Rd.		--	52
	H-5	Summerton; John Cochran House	840 Middletown Warwick Rd.		--	62
	H-6	Hedgelawn; Kohl Hs.; Wm R. Cochran Hs.	772 Middletown Warwick Rd.		--	60
	H-7	Cochran Grange; John P. Cochran Hs.	704 Middletown Warwick Rd.		--	60

NOTES: *Shading indicates existing receptor is impacted (66 dBA or higher).*
-- indicates receptor level is peak calculated-only.
(46) Indicates value was calculated using comparable receptors in the area.

2. Environmental Consequences

a. Predicted Future Noise Levels

FHWA requires noise to be analyzed in the "loudest noise hour" of the day. As noted previously, ambient measurements may not reflect the loudest hour of the day. The loudest noise hour traffic condition represents a combination of vehicle volume, classification mix and speed to produce the worst traffic noise condition that would be experienced along the project corridor. For existing conditions within the project area, the loudest noise hour typically occurs during the highest traffic volume conditions along existing US 301.

Future noise levels were predicted at receptor locations within influence of traffic noise for each retained alternative. Peak traffic volumes for the alternatives were predicted for the design year 2030. These volumes consist of peak AM or PM traffic flow, whichever is greater, and do not exceed LOS E. Volumes in excess of LOS E result in an inconsistent noise level, with excessive periods of low speed combined with stop and go movement. For any area where traffic volumes could exceed LOS E, volumes would be capped to create the loudest noise condition.

A comparison of predicted existing and future noise levels, including the No-Build Alternative and retained alternatives, is shown in ***Table III-33.*** Predicted noise levels were calculated to 0.1 dBA and then rounded to the nearest whole integer.

Impacted receptors in the table are shaded. An impact occurs if a receptor has a design-year predicted noise level of 66 dBA or greater (dark grey shading), or if a receptor experiences an increase of 10 dBA or greater than existing noise levels (light grey shading). For example, a receptor with an existing noise level of 47 dBA that would experience a design-year predicted noise level of 57 dBA or greater would be considered impacted.

Total impacts for each alternative, as shown on ***Table III-33***, are not determined by the number of impacted receptors, rather by the number of impacted residences that are represented by those receptors. For the Yellow alignment, NSA 14 has the greatest number of residential impacts. For the Purple alignment, most impacts are located at NSA 14, NSA 9 and NSA 3. For both Brown and Green alignments, NSA 3, NSA 6 and NSA 9 have the greatest number of noise impacts.

Table III-33: Predicted Design Year 2030 Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Site Name	Address	Existing Peak Hour Leq (dBA)	Design Year 2030						
					No-Build Leq (dBA)	Yellow Leq (dBA)	Purple Leq (dBA)	Brown-N Leq (dBA)	Brown-S Leq (dBA)	Green-N Leq (dBA)	Green-S Leq (dBA)
1	LE-1	Lea Eara Farms	323 Jessica Dr.	59	61	--	61	62	61	61	61
	LE-2	Lea Eara Farms	106 W. Cedarwood Dr.	50	53	--	52	60	51	52	52
	LE-3	Lea Eara Farms	669 Old Summit Bridge Rd.	57	59	--	58	68	57	58	58
	LE-4	Lea Eara Farms	421 Maplewood Dr.	45	48	--	47	50	46	47	47
	LE-5	Lea Eara Farms	121 E. Cedarwood Dr.	47	50	--	49	54	49	49	49
2	SF-1	Summit Farms	Lorewood Grove Rd.	56	56	--	--	53	46	--	--
	SF-2	Summit Farms	318 John Randal Dr.	46	46	--	--	52	47	--	--
	SF-3	Summit Farms	1370 Lorewood Grove Rd.	47	47	--	--	48	45	--	--
	SF-4	Summit Farms	210 Sheats Ln.	50	50	--	--	48	43	--	--
	SF-5	Summit Farms	224 Sheats Ln.	46	46	--	--	45	42	--	--
	H-26	S. Rothwell House	669 Old Summit Bridge Rd.	58	61	--	--	62	--	--	--
3	SB-1	Summit Bridge Farms	117 Delaware Canal Ct. E	54	57	62	59	59	61	59	59
	SB-2	Summit Bridge Farms	108 Laks Dr.	53	55	55	52	58	55	52	52
	SB-3	Summit Bridge Farms	133 Delaware Canal Ct. E	47	50	51	49	53	52	49	49
	SB-4	Summit Bridge Farms	120 Laks Dr.	46	48	48	49	54	51	49	49
	SB-5	Summit Bridge Farms	138 Delaware Canal Ct. E	43	45	47	47	50	54	47	47
4	SP-1	Summit Pond	Victoria Dr. Entrance	72	75	--	--	--	--	--	--
	SP-2	Summit Pond	911 Waterlily Ln.	52	55	--	--	--	--	--	--
	SP-3	Summit Pond	720 Victoria Dr.	50	53	--	--	--	--	--	--
	H-16	A. Eliason House; Twin Holly Farms	4353 Summit Bridge Rd.	70	73	--	--	--	--	--	--
5	BC-1	Boyds Corner at US 301	475 Boyds Corner Road	68	70	70	--	--	--	--	--
	CR-1	Crystal Run Farm	226 Waterford Dr.	47	43	43	--	--	--	--	--
	CR-2	Crystal Run Farm	135 Crystal Run Dr.	38	40	40	--	--	--	--	--
	RA-1	Ratledge Road	450 Ratledge Road	(46)	46	--	--	--	--	62	--

NOTES:
Dark grey shading indicates impacted receptor (66 dBA or higher).
Light grey shading indicates impacted receptor (10 dBA or greater than existing).
-- indicates receptor is not influenced by the alternative traffic noise (> 1,500 feet distant).
(46) indicates value was calculated using comparable receptors in the project area.

Table III-33: Predicted Design Year 2030 Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Site Name	Address	Existing Peak Hour Leq (dBA)	Design Year 2030						
					No-Build Leq (dBA)	Yellow Leq (dBA)	Purple Leq (dBA)	Brown-N Leq (dBA)	Brown-S Leq (dBA)	Green-N Leq (dBA)	Green-S Leq (dBA)
6	CM-1	Chesapeake Meadow	208 Deerfield Dr.	47	47	--	52	57	55	52	52
	CM-2	Dickerson Farm	600 Schoonover Ln.	51	51	--	43	47	45	43	43
	CM-3	Chesapeake Meadow	26 Meadow Ln.	47	47	--	60	63	59	60	60
	CM-4	Dickerson Farm	313 W. Dickerson Lane	51	51	--	43	47	46	43	43
	CM-5	Dickerson Farm	523 E. Creek Ln.	49	49	--	--	45	47	--	--
7	BH-1	Bohemia Mill Road West	1203 Sharp Ln.	60	68	61	58	58	58	58	58
	MA-1	Matapeake	100 Sassafrass Dr.	43	51	--	47	47	47	47	47
	PR-1	Fox Hunter Crossing	1542 Choptank Rd.	58	58	--	60	67	67	60	60
	PR-2	n/a	1620 Choptank Rd.	54	54	--	45	49	49	45	45
	PR-3	n/a	830 Old School House Rd.	52	52	--	n/a	n/a	n/a	n/a	n/a
	PR-4	Post and Rail Farms	102 Saddle Dr.	51	51	--	44	48	48	44	44
	PR-5	Post and Rail Farms	116 Saddle Dr.	47	47	--	45	49	49	45	45
	H-8	Rosedale; Mary Del Farm	1143 Bunker Hill Rd.	(46)	51	--	52	52	52	52	52
	H-10	S. Holton Farm	2010 Choptank Rd.	46	54	--	60	58	58	60	60
	H-28	Choptank; J. Clayton Farm	1542 Choptank Road	(46)	48	--	44	48	48	44	44
8	C-1	n/a	416 Armstrong Corner Rd.	54	54	--	58	52	52	58	58
	C-2	n/a	5036 Summit Bridge Rd.	62	62	51	67	--	--	67	67
	C-3	n/a	5036 Summit Bridge Rd.	69	69	67	67	--	--	67	67
	C-4	n/a	617 Marl Pit Rd.	59	59	55	--	--	--	--	--
	C-5	n/a	617 Marl Pit Rd.	43	44	47	--	--	--	--	--
	LG-1	The Legends West	10 Couples Ct.	53	53	58	--	--	--	--	--
	OS-1	Old Schoolhouse Rd. at US 301	626 Old Schoolhouse Rd.	48	48	52	--	--	--	--	--

NOTES:
Dark grey shading indicates impacted receptor (66 dBA or higher).
Light grey shading indicates impacted receptor (10 dBA or greater than existing).
-- indicates receptor is not influenced by the alternative traffic noise (> 1,500 feet distant).
(46) indicates value was calculated using comparable receptors in the project area.

Table III-33: Predicted Design Year 2030 Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Site Name	Address	Existing Peak Hour Leq (dBA)	Design Year 2030						
					No-Build Leq (dBA)	Yellow Leq (dBA)	Purple Leq (dBA)	Brown-N Leq (dBA)	Brown-S Leq (dBA)	Green-N Leq (dBA)	Green-S Leq (dBA)
8	SM-1	Springmill	Carter Dr.	57	56	55	--	--	--	--	--
	SM-2	Springmill	Windmill Lane	62	62	63	--	--	--	--	--
	SM-3	Springmill	Whispering Trail	55	55	63	--	--	--	--	--
	SM-4	Springmill	Daylily Way	(46)	(46)	--	53	53	53	53	53
	SM-5	Springmill	Springmill Dr.	35	35	--	43	43	43	43	43
	H-9	R.G. Hayes House	5187 Summit Bridge Rd.	66	66	(take)	--	--	--	--	--
	H-11	Armstrong-Walker House; J. Cox Est.	5036 Summit Bridge Rd.	67	67	65	66	66	66	66	66
	H-12	Achmester	North Side of Marl Pit Rd.	(46)	(46)	48	--	--	--	--	--
	H-14	Weston; S. Brady Farm	4677 Summit Bridge Rd.	51	52	54	--	--	--	--	--
	H-15	Mt. Pleasant Farm	4564 Summit Bridge Rd.	48	48	52	--	--	--	--	--
9	MV-1	Middletown Village	Liborio Dr.	47	48	54	--	--	--	--	--
	MV-2	Middletown Village	112 Sandhill Rd.	58	58	59	--	--	--	--	--
	MV-3	Middletown Village	110 Sleepy Hollow Dr.	50	50	50	--	--	--	--	--
	MV-4	Middletown Village	766 Marian Dr.	62	62	52	--	--	--	--	--
	MV-5	Middletown Village	Peterson Rd.	55	55	57	--	--	--	--	--
	MV-6	Middletown Village	1106 Bunker Hill Rd.	50	50	--	46	46	46	46	46
	MV-7	Middletown Village	Ash Blvd.	51	51	52	--	--	--	--	--
	MV-8	Middletown Village	828 Woodline Dr.	45	45	--	57	57	57	57	57
	MV-9	Middletown Village	Ash Blvd.	44	45	47	44	44	44	44	44
	MV-10	Middletown Village	334 E. Harvest Ln.	56	56	53	--	--	--	--	--
	MV-11	Middletown Village	125 Foxtail Ln.	57	58	67	--	--	--	--	--
10	M-1	Middletown	691 Broad St.	54	54	50	--	--	--	--	--

NOTES:
Dark grey shading indicates impacted receptor (66 dBA or higher).
Light grey shading indicates impacted receptor (10 dBA or greater than existing).
-- indicates receptor is not influenced by the alternative traffic noise (> 1,500 feet distant).
(46) indicates value was calculated using comparable receptors in the project area.

Table III-33: Predicted Design Year 2030 Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Site Name	Address	Existing Peak Hour Leq (dBA)	Design Year 2030						
					No-Build Leq (dBA)	Yellow Leq (dBA)	Purple Leq (dBA)	Brown-N Leq (dBA)	Brown-S Leq (dBA)	Green-N Leq (dBA)	Green-S Leq (dBA)
11	A-1	Appoquinimink High School	1080 Bunker Hill Rd.	(46)	(46)	--	53	53	53	53	53
	SO-1	Southridge	15 Palisade Circle	(46)	(46)	--	58	58	58	58	58
	SR-1	n/a	Bunker Hill Rd.	40	41	--	n/a	n/a	n/a	n/a	n/a
	SR-2	n/a	1106 Bunker Hill Rd.	64	64	--	67	67	67	67	67
	SR-3	n/a	Bunker Hill Rd.	61	61	--	--	--	--	--	--
	SR-4	n/a	Bunker Hill Rd.	62	62	69	--	--	--	--	--
	SR-5	n/a	Bunker Hill Rd.	68	69	65	--	--	--	--	--
	H-25	The Maples; George Derrickson Hs.	North Side of Bunker Hill Rd.	60	64	--	58	58	58	58	58
12	AM-1	Airmont Acres	502 Davis Ct.	52	52	--	--	57	56	56	--
	AM-2	Airmont Acres	236 Oak Dr.	51	51	--	--	59	58	59	--
	AM-3	n/a	Lorewood Grove / Ratledge	48	48	--	--	--	--	--	--
	AM-4	Airmont Acres	784 Lorewood Grove Rd.	66	66	--	--	--	--	--	--
	AM-5	n/a	Lorewood Grove Rd.	68	68	--	--	--	--	--	--
	SG-1	St. Georges Technical High School	555 Hyetts Corner Rd.	51	51	--	--	58	58	58	--
	H-17	Old Ford Dairy (NOT Eligible)	West Side of Rt. 13	56	60	--	--	61	61	61	61
13	JC-1	n/a	Boyds Corner Rd.	51	51	--	--	--	--	--	--
	JC-2	n/a	1000 Jamison Corner Rd.	49	49	--	--	--	--	--	51
	JC-3	n/a	Jamison Corner Rd.	51	51	--	--	56	56	57	--
	JC-4		1075 Jamison Corner Rd.	43	43	50	50	--	--	--	50
	H-22	S.F. Shallcross House	1049 Boyds Corner Rd.	55	56	61	61	--	--	--	--
	H-23	Mrs. Cleavers House (NOT Eligible)	915 Boyds Corner Rd.	54	55	57	57	--	--	--	--
	H-24	J. Houston House	1000 Jamison Corner Rd.	49	49	--	--	--	--	--	58

NOTES:
Dark grey shading indicates impacted receptor (66 dBA or higher).
Light grey shading indicates impacted receptor (10 dBA or greater than existing).
-- indicates receptor is not influenced by the alternative traffic noise (> 1,500 feet distant).
(46) indicates value was calculated using comparable receptors in the project area.

Table III-33: Predicted Design Year 2030 Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Site Name	Address	Existing Peak Hour Leq (dBA)	Design Year 2030						
					No-Build Leq (dBA)	Yellow Leq (dBA)	Purple Leq (dBA)	Brown-N Leq (dBA)	Brown-S Leq (dBA)	Green-N Leq (dBA)	Green-S Leq (dBA)
14	GV-1	Grande View Farms	203 Milford Dr.	57	57	63	63	--	--	--	--
	GV-2	Grande View Farms	258 Milford Dr.	55	55	--	--	--	--	--	--
	GV-3	Asbury Chase	203 Red Fox Ct.	47	47	--	--	--	--	--	--
	GV-4	Grande View Farms	149 Jane Ct.	56	56	62	62	--	--	--	--
	GV-5	Grande View Farms	320 Hyetts Corner Rd.	52	52	57	57	--	--	--	--
	GV-6	Asbury Chase	864 Bullen Dr.	62	62	66	66	--	--	--	--
	H-19	"Fairview"; A.H. Diehl House	350 Hyetts Corner Rd.	58	60	64	63	--	--	--	--
15	CL-1	n/a	562 Boyds Corner Road	69	69	--	--	--	--	--	--
	CL-2	Cedar Lane Elementary & Middle Sch.	1259 Cedar Lane	68	68	70	70	--	--	--	--
	CL-3	n/a	Emerson Rd.	57	57	--	--	--	--	--	--
	CL-4	Chestnut Grove	201 Chestnut Way	51	51	--	--	--	--	--	--
	CL-5	n/a	617 Marl Pit	65	65	--	--	--	--	--	--
	CL-6	Cedar Lane Elementary & Middle Sch.	1235 Cedar Land Rd.	60	61	63	63	--	--	--	--
	H-13	Lovett Farm/Mrs. Templeman House	1405 Cedar Lane Rd.	(46)	(46)	--	--	--	--	--	--
	H-29	T. J. Houston House	1309 Cedar Lane Rd.	(46)	(46)	--	--	--	--	--	45
	SA-1	Cedar Lane Elementary School	1235 Cedar Lane Rd.	64	64	65	65	--	--	--	65
16	MM-1	Biggs Farm	Bethel Church Rd.	57	64	57	54	55	55	54	54
	MM-2	Biggs Farm	Bethel Church Rd.	42	50	44	45	49	49	45	45
	MM-3	Back Creek	105 Joshua Ct.	49	56	50	47	48	48	47	47
	MM-4	Back Creek	103 Saint Andrews Ct.	38	46	40	40	43	43	40	40
	MM-5	Fox Hunter Crossing	116 Senator Dr.	62	69	63	59	60	60	59	59
	MM-6	Fox Hunter Crossing	116 Colonel Clayton Dr.	44	52	46	44	46	46	44	44
	H-27	Woodside	1370 Choptank Rd	58	63	--	55	55	55	55	55
	H-31	Biggs Farm	1196 Choptank Rd	47	56	--	49	54	53	49	49

NOTES:
Dark grey shading indicates impacted receptor (66 dBA or higher).
Light grey shading indicates impacted receptor (10 dBA or greater than existing).
-- indicates receptor is not influenced by the alternative traffic noise (> 1,500 feet distant).
(46) indicates value was calculated using comparable receptors in the project area.

Table III-33: Predicted Design Year 2030 Noise Levels

Noise Sensitive Area	Receptor	Community or Historic Site Name	Address	Existing Peak Hour Leq (dBA)	Design Year 2030						
					No-Build Leq (dBA)	Yellow Leq (dBA)	Purple Leq (dBA)	Brown-N Leq (dBA)	Brown-S Leq (dBA)	Green-N Leq (dBA)	Green-S Leq (dBA)
17	PF-1	Penfield Farms	2106 S. Dupont Hwy. N	61	61	--	--	68	68	68	68
	PF-2	Penfield Farms	S. Dupont Hwy. N	57	57	--	--	55	54	54	54
	PF-3	Penfield Farms	381 Port Penn Road	62	62	--	--	--	--	--	--
	H-18	Idalia Manor; Mrs. M.A. Osborne	1870 S. Dupont Highway	59	63	63	63	63	63	63	63
	H-20	Retirement Farm	2256 Dupont Hwy N	49	53	55	55	--	--	--	--
	H-21	J.M. Vandergrift House; Elm Grange	2424 S. Dupont Highway	64	68	68	68	--	--	--	--
18	S-1	n/a	1963 Middle Neck Rd.	58	58	47	54	54	54	54	54
	S-2	n/a	1963 Middle Neck Rd.	50	50	49	57	57	57	57	57
	S-3	n/a	1963 Middle Neck Rd.	60	60	51	62	62	62	62	62
	S-4	n/a	1963 Middle Neck Rd.	54	54	54	n/a	n/a	n/a	n/a	n/a
	S-5	n/a	1963 Middle Neck Rd.	59	60	57	n/a	n/a	n/a	n/a	n/a
	S-6	n/a	1963 Middle Neck Rd.	68	69	63	67	67	67	67	67
	H-1	Shahan Farm, Lanape Acres	389 Strawberry Ln.	(46)	(46)	--	--	--	--	--	--
	H-2	B.F. Hanson House	1102 Middletown Warwick Rd.	61	63	58	59	59	59	59	59
	H-3	C. Polk House Estate	929 Middletown Warwick Rd.	56	56	53	56	56	56	56	56
	H-4	Rumsey Farm	841 Middletown Warwick Rd.	52	53	53	52	52	52	52	52
	H-5	Summerton; John Cochran House	840 Middletown Warwick Rd.	62	63	(take)	61	61	61	61	61
	H-6	Hedgelawn; Kohl Hs.; Wm. Cochran Hs.	772 Middletown Warwick Rd.	60	60	60	--	--	--	--	--
	H-7	Cochran Grange; John P. Cochran Hs.	704 Middletown Warwick Rd.	60	59	60	--	--	--	--	--
TOTAL Number of Residential Impacts per Alternative						**Yellow 74**	**Purple 108**	**Brown N 67**	**Brown S 64**	**Green N 77**	**Green S 63**

NOTES:
Dark grey shading indicates impacted receptor (66 dBA or higher).
Light grey shading indicates impacted receptor (10 dBA or greater than existing).
-- indicates receptor is not influenced by the alternative traffic noise (> 1,500 feet distant).
(46) indicates value was calculated using comparable receptors in the project area.

b. Impact Assessment/Abatement

Noise Abatement Criteria

Traffic noise impacts were assessed, and the potential for introducing mitigating measures, such as noise walls or berms, was evaluated. Consideration for mitigation is based on the size of the impacted area, the predominant activity within the area, visual impact, construction practicality, feasibility and reasonableness. The factors considered when determining whether the mitigation would be considered, as outlined in DelDOT's Transportation Noise Policy, are:

- A reasonable and feasible noise mitigation method is available. DelDOT will identify and evaluate impacts that noise abatement measures will have on the social, economic and natural environments when determining the feasibility and reasonableness of a noise barrier project. An attempt will be made to provide noticeable and effective noise reductions of at least **5 dBA** at impacted receptors. This reduction is known as Insertion Loss.
- Noise mitigation is cost-effective – not to exceed **$20,000 per benefited residence**.
- Noise mitigation is acceptable to the majority of people affected.

When determining the cost-effectiveness of mitigation, all impacted receptors that receive a 5 dBA or more reduction in noise levels are considered to benefit by a noise wall or berm construction. For the purposes of cost evaluation, a total cost of $25.00 per square foot has been used to estimate the noise wall cost and $10.00 per cubic yard of berm. These cost figures are based upon current experience and reflect the cost of constructing an earth berm or ground mounted noise wall system.

Impacts and Mitigation Feasibility

Impacts associated with the proposed alternatives and the feasibility of mitigation are shown for each alternative in the following tables. The most frequent mitigation is in the form of a noise barrier or berm. Barrier and berm mitigation are discussed in the following paragraphs and summarized in the accompanying tables.

As shown in ***Table III-34***, barrier mitigation of projected noise impacts with the Yellow Alternative is feasible but not reasonable for NSAs 3, 9 and 14 (Grande View Farms/Asbury Chase I and II) due to cost effectiveness criteria (must be no more than $20K per benefited residence). Noise mitigation for NSAs 5, 14 (south of Boyds Corner, near US 13) and 17 is not feasible due to extraneous traffic noise from other nearby roadways. Berm construction is not feasible in the space provided between the roadway and those impacted NSAs where barrier mitigation is otherwise feasible.

Table III-34: Yellow Alternative Abatement Cost Analysis

NSA/Community		Number of Impacts	Barrier /Berm Height (ft)	Barrier /Berm Length (ft)	Insertion Loss (first row) (dBA)	Barrier /Berm Cost	Benefited Residences	Cost per Benefited Residence	Comment
BARRIER ANALYSIS									
3	Summit Bridge Farms	12	10	1,900	5	$475,000	12	$39,583	Barrier along N side only
5	Boyds Corner at US301	11	SR896 traffic negates US301 noise mitigation						Mitigation not feasible
9	Middletown Village	6	11	650	5	$178,750	6	$29,792	
14	Grande View Farms/ Asbury Chase (GV/AC)	35	9	7,890	5	$1,775,250	38	$46,717	Barrier along GV/AC perimeter
14	S of Boyds Corner, near US13	3	SR896 traffic negates US301 noise mitigation						Mitigation not feasible
17	East of US13, near GV/AC	7	SR1 & US13 traffic negates noise mitigation						Mitigation not feasible
					Totals	**$2,429,000**	**56**	**$43,375**	
BERM ANALYSIS									
3	Summit Bridge Farms	12	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
5	Boyds Corner at US301	11	SR896 traffic negates US301 noise mitigation						Mitigation not feasible
9	Middletown Village	6	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
14	Grande View Farms/ Asbury Chase	35	No room for berm between US13 / SR896 and 1st-Row impacted properties						Mitigation not feasible
14	S of Boyds Corner, near US13	3	SR896 traffic negates US301 noise mitigation						Mitigation not feasible
17	East of US13, near GV/AC	7	SR1 & US13 traffic negates noise mitigation						Mitigation not feasible

As shown in ***Table III-35***, barrier mitigation of projected noise impacts for the Purple Alternative is feasible for all NSAs with the exception of NSAs 14 (S. Boyds Corner, near U.S. 13) and 17. Extraneous traffic noise from other nearby roadways would render mitigation ineffective at these locations. Barrier mitigation is not reasonable for any NSA due to costs per benefited residence exceeding $20K. Berm mitigation is not feasible for NSAs 3, 7, 8 and 14 (Grandview Farms/Asbury Chase I & II) due to lack of right-of-way. Berm mitigation is not cost effective for NSAs 6, 9 and 11 where berms are feasible.

Table III-35: Purple Alternative Abatement Cost Analysis

NSA/Community		Number of Impacts	Barrier /Berm Height (ft)	Barrier /Berm Length (ft)	Insertion Loss (first row) (dBA)	Barrier /Berm Cost	Benefited Residences	Cost per Benefited Residence	Comment
Barrier Analysis									
3	Summit Bridge Farms	12	10	1,900	5	$475,000	12	$39,583	Barrier along N side only
6	Chesapeake Meadow	11	11	2,190	6	$602,250	9	$66,917	2 northernmost impacts cannot be benefited
7	Mid Farms	4	8	2,410	8	$482,000	4	$120,500	4 flag-lot props being developed on Old School House
7	Midland Farms West	4	13	3,880	8	$1,261,000	4	$315,250	1868/1888/1902 & 2010 (historic, not MF) Choptank Rd.
8	Midland Farms East	6	13	2,950	5	$958,750	6	$159,792	3 Armstrong Corner Rd & 3 Bohemia Mill Rd. impacts.
9	Middletown Village	15	16	2,000	6	$800,000	15	$53,333	
11	Southridge	7	15	970	5	$363,750	3	$121,250	Can not provide -5dBA to 4 impacts
14	Grande View Farms/ Asbury Chase	35	9	7,890	5	$1,775,250	38	$46,717	Barrier along GV/AC perimeter
14	S of Boyds Corner, near US13	3	SR896 traffic negates US301 noise mitigation						Mitigation not feasible
17	East of US13, near GV/AC	7	SR1 & US13 traffic negates noise mitigation						Mitigation not feasible
					Totals	**$6,718,000**	**91**	**$73,824**	
Berm Analysis									
3	Summit Bridge Farms	12	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
6	Chesapeake Meadow	11	11	2,190	6	$281,050	9	$31,228	2 northernmost impacts can not be benefited
7	Mid Farms	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
7	Midland Farms West	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
8	Midland Farms East	6	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
9	Middletown Village	15	16	2,000	6	$521,481	15	$34,765	
11	Southridge	7	15	970	5	$223,639	3	$74,546	Can not provide -5dBA to 4 impacts
14	Grande View Farms/ Asbury Chase	35	No room for berm between US13 / SR896 and 1st-Row impacted properties						Mitigation not feasible
14	S of Boyds Corner, near US13	3	SR896 traffic negates US301 noise mitigation						Mitigation not feasible
17	East of US13, near GV/AC	7	SR1 & US13 traffic negates noise mitigation						Mitigation not feasible
					Totals	**$1,026,170**	**27**	**$38,006**	

As shown in ***Table III-36***, barrier mitigation of projected noise impacts with the Brown North Alternative is feasible for NSAs 1, 6, 7, 8, 9 and 11, but is not reasonable due to all costs exceeding $20K per benefited residence. Berm mitigation is not feasible for NSAs 7 and 8 due to lack of right-of-way, and is not cost effective for the NSAs 1, 6, 9 and 11 where berms are feasible.

Table III-36: Brown Alternative North Option Abatement Cost Analysis

NSA/Community		Number of Impacts	Barrier /Berm Height (ft)	Barrier /Berm Length (ft)	Insertion Loss (first row) (dBA)	Barrier /Berm Cost	Benefited Residences	Cost per Benefited Residence	Comment
Barrier Analysis									
1	Lea Eara Farms	16	20	2,890	5	$1,445,000	4	$361,250	Can only benefit 4 residences
6	Chesapeake Meadow	15	15	2,160	8	$810,000	15	$54,000	2 benefits = non-impacted, 2 impacts can not be benefited
7	Mid Farms	4	14	2,610	8	$913,500	4	$228,375	4 flag-lot props being developed on Old School House
7	Midland Farms West	4	15	3,940	8	$1,477,500	4	$369,375	1868/1888/1902 Choptank Rd and 2010 Choptank Rd (historic, not Midland Farms).
8	Midland Farms East	3	15	1,800	5	$675,000	3	$225,000	3 Bohemia Mill Rd impacts.
9	Middletown Village	15	16	2,000	6	$800,000	15	$53,333	
11	Southridge	7	15	970	5	$363,750	3	$121,250	Can not provide -5dBA to 4 impacts
					Totals	**$6,484,750**	**48**	**$135,099**	
Berm Analysis									
1	Lea Eara Farms	16	20	2,890	5	$1,156,000	4	$289,000	Can only benefit 4 residences
6	Chesapeake Meadow	15	15	2,160	8	$498,000	15	$33,200	2 benefits = non-impacted, 2 impacts can not be benefited
7	Mid Farms	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
7	Midland Farms West	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
8	Midland Farms East	3	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
9	Middletown Village	15	16	2,000	6	$521,481	15	$34,765	
11	Southridge	7	15	970	5	$223,639	3	$74,546	Can not provide -5dBA to 4 impacts
					Totals	**$2,399,120**	**37**	**$64,841**	

As shown in ***Table III-37***, barrier mitigation of projected noise impacts with the Brown South Alternative is feasible for NSAs 3, 6, 7, 8, 9 and 11, but is not reasonable due to all costs exceeding $20K per benefited residence. Berm mitigation is not feasible for NSAs 7 and 8 due to lack of right-of-way, and is not cost effective for the NSAs 3, 6, 9 and 11 where berms are feasible.

Table III-37: Brown Alternative South Option Abatement Cost Analysis

NSA/Community		Number of Impacts	Barrier /Berm Height (ft)	Barrier /Berm Length (ft)	Insertion Loss (first row) (dBA)	Barrier /Berm Cost	Benefited Residences	Cost per Benefited Residence	Comment
Barrier Analysis									
3	Summit Bridge Farms	18	12	3,700	5	$1,110,000	18	$61,667	10' North wall plus 15' SE wall
6	Chesapeake Meadow	11	14	2,470	6	$864,500	9	$96,056	2 impacts can not be benefited
7	Mid Farms	4	14	2,610	8	$913,500	4	$228,375	4 flag-lot props being developed on Old School House
7	Midland Farms West	4	15	3,940	8	$1,477,500	4	$369,375	1868/1888/1902 Choptank Rd and 2010 Choptank Rd (historic, not Midland Farms).
8	Midland Farms East	3	15	1,800	5	$675,000	3	$225,000	3 Bohemia Mill Rd impacts.
9	Middletown Village	15	16	2,000	6	$800,000	15	$53,333	
11	Southridge	7	15	970	5	$363,750	3	$121,250	Can not provide -5dBA to 4 impacts
					Totals	**$6,204,250**	**56**	**$110,790**	
Berm Analysis									
3	Summit Bridge Farms	18	15	1,800	5	$415,000	6	$69,167	Berm feasible on SE side only
6	Chesapeake Meadow	11	14	1,893	6	$382,807	9	$42,534	2 impacts can not be benefited
7	Mid Farms	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
7	Midland Farms West	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
8	Midland Farms East	3	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
9	Middletown Village	15	16	2,000	6	$521,481	15	$34,765	
11	Southridge	7	15	970	5	$223,639	3	$74,546	Can not provide -5dBA to 4 impacts
					Totals	**$1,542,927**	**33**	**$46,755**	

As shown in ***Table III-38***, barrier mitigation of projected noise impacts with the Green North Alternative is feasible for NSAs 3, 5, 6, 7, 8, 9 and 11, but is not reasonable due to all costs exceeding $20K per benefited residence. Berm mitigation is not feasible for NSAs 3, 7 and 8 due to lack of right-of-way, and is not cost effective for the NSAs 5, 6, 9 and 11 where berms are feasible.

Table III-38: Green Alternative North Option Abatement Cost Analysis

NSA/Community		Number of Impacts	Barrier /Berm Height (ft)	Barrier /Berm Length (ft)	Insertion Loss (first row) (dBA)	Barrier /Berm Cost	Benefited Residences	Cost per Benefited Residence	Comment
Barrier Analysis									
3	Summit Bridge Farms	12	10	1,900	5	$475,000	12	$39,583	Barrier along N side only
5	Ratledge Road	14	10	2,280	5	$570,000	6	$95,000	
6	Chesapeake Meadow	11	11	2,190	6	$602,250	9	$66,917	2 northernmost impacts can not be benefited
7	Mid Farms	4	8	2,410	8	$482,000	4	$120,500	4 flag-lot props being developed on Old School House
7	Midland Farms West	4	13	3,880	8	$1,261,000	4	$315,250	1868/1888/1902 Choptank Rd and 2010 Choptank Rd (historic, not Midland Farms).
8	Midland Farms East	6	13	2,950	5	$958,750	6	$159,792	3 Armstrong Corner Rd & 3 Bohemia Mill Rd. impacts.
9	Middletown Village	15	16	2,000	6	$800,000	15	$53,333	
11	Southridge	7	15	970	5	$363,750	3	$121,250	Can not provide -5dBA to 4 impacts
					Totals	**$5,512,750**	**58**	**$95,047**	
Berm Analysis									
3	Summit Bridge Farms	12	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
5	Ratledge Road	14	10	2,280	5	$244,889	6	$40,815	
6	Chesapeake Meadow	11	11	2,190	6	$281,050	9	$31,228	2 northernmost impacts can not be benefited
7	Mid Farms	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
7	Midland Farms West	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
8	Midland Farms East	6	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
9	Middletown Village	15	16	2,000	6	$521,481	15	$34,765	
11	Southridge	7	15	970	5	$223,639	3	$74,546	Can not provide -5dBA to 4 impacts
					Totals	**$1,542,927**	**33**	**$46,755**	

As shown in ***Table III-39***, barrier mitigation of projected noise impacts with the Green South Alternative is feasible for NSAs 3, 6, 7, 8, 9 and 11, but is not reasonable due to all costs exceeding $20K per benefited residence. Berm mitigation is not feasible for NSAs 3, 7 and 8 due to lack of right-of-way, and is not cost effective for the NSAs 6, 9 and 11 where berms are feasible.

Table III-39: Green Alternative South Option Abatement Cost Analysis

NSA/Community		Number of Impacts	Barrier /Berm Height (ft)	Barrier /Berm Length (ft)	Insertion Loss (first row) (dBA)	Barrier /Berm Cost	Benefited Residences	Cost per Benefited Residence	Comment
Barrier Analysis									
3	Summit Bridge Farms	12	10	1,900	5	$475,000	12	$39,583	Barrier along N side only
6	Chesapeake Meadow	11	11	2,190	6	$602,250	9	$66,917	2 northernmost impacts can not be benefited
7	Mid Farms	4	8	2,410	8	$482,000	4	$120,500	4 flag-lot props being developed on Old School House
7	Midland Farms West	4	13	3,880	8	$1,261,000	4	$315,250	1868/1888/1902 Choptank Rd and 2010 Choptank Rd (historic, not Midland Farms).
8	Midland Farms East	6	13	2,950	5	$958,750	6	$159,792	3 Armstrong Corner Rd & 3 Bohemia Mill Rd. impacts.
9	Middletown Village	15	16	2,000	6	$800,000	15	$53,333	
11	Southridge	7	15	970	5	$363,750	3	$121,250	Can not provide -5dBA to 4 impacts
					Totals	**$4,942,750**	**53**	**$93,259**	
Berm Analysis									
3	Summit Bridge Farms	12	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
6	Chesapeake Meadow	11	11	2,190	6	$281,050	9	$31,228	2 northernmost impacts can not be benefited
7	Mid Farms	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
7	Midland Farms West	4	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
8	Midland Farms East	6	No room for berm between US301 and 1st-Row impacted properties						Mitigation not feasible
9	Middletown Village	15	16	2,000	6	$521,481	15	$34,765	
11	Southridge	7	15	970	5	$223,639	3	$74,546	Can not provide -5dBA to 4 impacts
					Totals	**$1,026,170**	**27**	**$38,006**	

c. Impact Assessment/Abatement Conclusions

Noise mitigation for all impacted residences/communities was found to not meet DelDOT's criteria for cost-effectiveness, which is no more than $20,000 per benefited residence. Additionally, mitigation for certain communities was found to be not feasible due to either lack of right-of-way (if an earthen berm) or traffic noise influence from nearby or surrounding roadways.

Although all noise mitigation by barrier walls or berms does not meet DelDOT criteria for reasonableness and feasibility, the project will incorporate aesthetic earthen berms into the initial roadway design for visual shielding of traffic from the communities where possible. Refer to **Sections A.6 and A.7** and ***Table III-14*** for a discussion of visual berms. Such "visual" berms should also provide desirable noise effects for the communities.

3. Construction Noise

Temporary noise impacts may occur from construction activity. Areas around the construction zone will experience varied periods and degrees of noise that differ from that of surrounding ambient community noise levels. Temporary Construction noise impacts are discussed in ***Section III.I.3***.

E. Hazardous Materials Sites

1. Existing Conditions

Two environmental databases maintained by DNREC, the Site Investigation and Restoration Branch Environmental Navigator and the Tank Management Branch Environmental Information System, were reviewed in order to identify known contaminated sites that are located adjacent to or within the vicinity of the project area. The DNREC databases include coverage of sites with contaminant releases that have been listed by EPA under CERCLA and RCRA. The potential risk of subsurface contamination to the project area was evaluated based upon information derived from the database review.

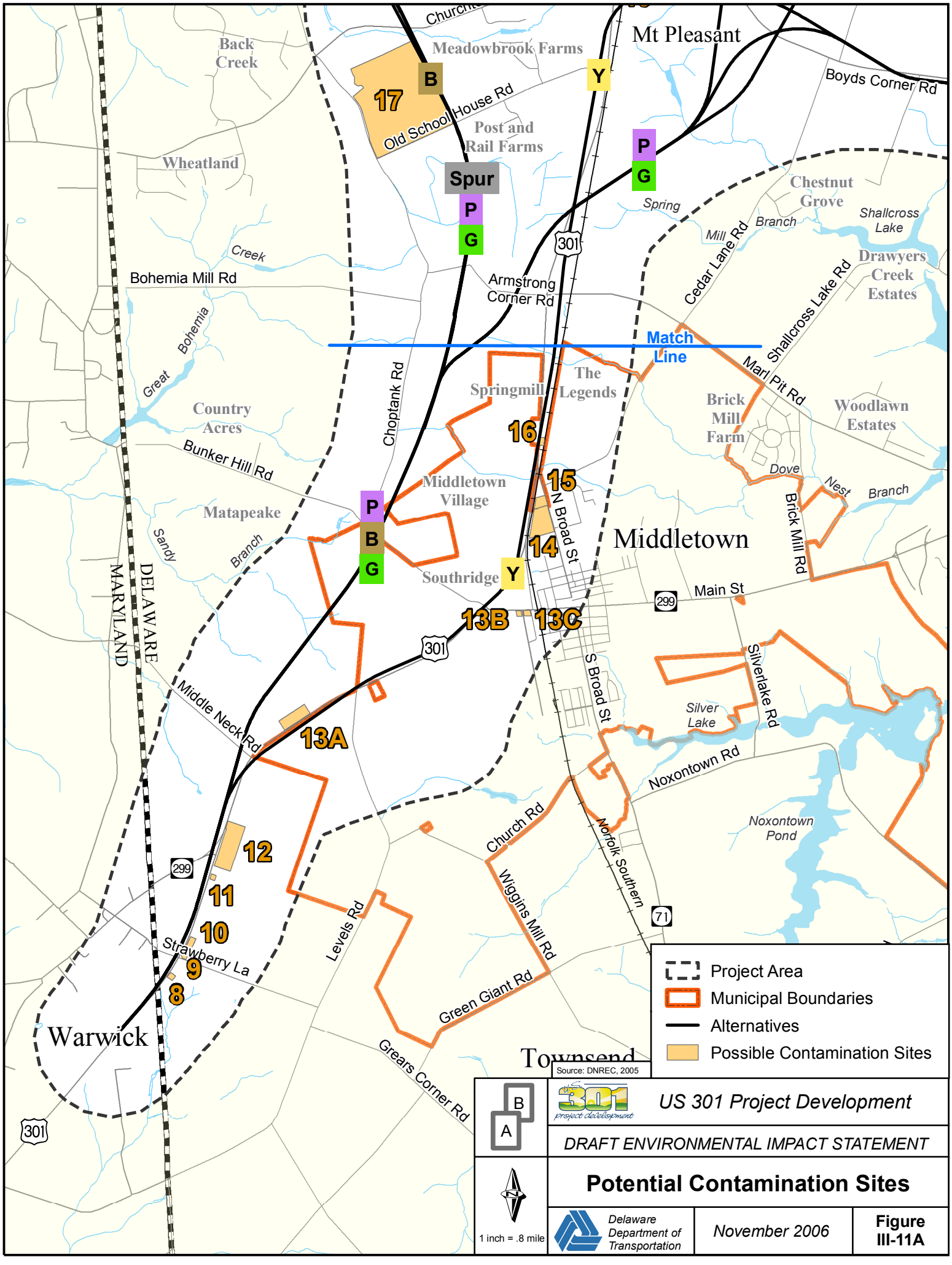
Sites identified as sources of contamination consisted of a combination of commercial, railroad and state-owned properties. Property uses in the vicinity of the project area included gasoline stations; industrial, commercial, and retail facilities; an airport; auto and farm equipment repair shops; and railroad support operations. Leaking underground petroleum storage tanks (LUSTs) accounted for most of the documented contamination. DNREC has issued rulings of No Further Action for most of these sites; however, residual levels of localized petroleum contamination probably remain. Sites identified as potential sources of contamination to the project area are identified in ***Table III-40*** and ***Table III-41*** and shown on ***Figure III-11***.

Table III-40:
DNREC LUST Sites with Documented or Suspected Contamination

Site Map #	Site of Concern	Property Use	Potential Type of Contamination	Contaminant of Concern
1	King General Store, Formerly Shore Stop #260, 4296 DuPont Highway, Townsend, DE 19734	Gas Station	Soil	Petroleum
2	Shore Stop #227, 4235 South DuPont Parkway, Townsend, DE 19734	Gas Station	Soil	Petroleum
4	Bell Atlantic Cell Site, 3925 South DuPont Highway, Townsend, DE 19734	Cell Tower Generator	Soil	Petroleum
6	DELDOT ROW, Al's Place, 3783 DuPont Highway, Townsend, DE 19734	Former Gas Station	Soil	Petroleum

Table III-40:
DNREC LUST Sites with Documented or Suspected Contamination

Site Map #	Site of Concern	Property Use	Potential Type of Contamination	Contaminant of Concern
7	Fieldsboro Amoco, 3622 South DuPont Highway, Townsend, DE 19734	Gas Station	Soil	Petroleum
8	Former Blue Star Texaco – US 301 South of Strawberry Lane, Middletown	Former Gasoline Station	Soil	Petroleum SIRB File
9	Valero Gasoline Station – 137 Strawberry Lane, Middletown, 19709	Gasoline Station	Soil	Petroleum
10	StarDel, Inc., Former Harris Property 1330 Warwick Road, Middletown.	Gasoline Station	Soil	Petroleum SIRB File
11	Coastal Mart – 1228 Middletown Warwick Road, Middletown	Gasoline Station	Soil	Petroleum
12	Hoober, Inc., Former Whiteman & Sons Property – 1130 Middletown Warwick Rd, Middletown, DE 19709	Farm Equipment Dealer	Soil	Petroleum
13A	301 Truck Plaza – 921 Middletown Warwick Rd, Middletown	Truck Stop/ Gasoline Station	Soil	Petroleum
13B	Shore Stop #235, 400 W. Main Street, Middletown, DE 19709	Gas Station	Soil	Petroleum
13C	Shore Stop #263, 308 W. Main Street, Middletown, DE 19709	Gas Station	Soil	Petroleum
14	Johnson Controls Battery Group, Inc. 700 North Broad Street, Middletown	Battery Manufacturing Facility	Soil	Petroleum
15	Southern States – 900 N. Broad Street, Middletown	Former Fuel Distributor	Soil	Petroleum
16	Nucar Middletown Chevrolet, Formerly Shallcross Chevrolet – 5221 Summit Bridge Road, Middletown	Auto Dealer	Soil	Petroleum
17	MaryDel Farm – 1542 Choptank Road, Middletown	Farm	Soil	Petroleum
18	Summit Bridge Shopping Center – 4466 Summit Bridge Road, Middletown	Shopping Center	Soil	Petroleum
21	Summit Airport	Aircraft Fueling/ Maintenance	Soil	Petroleum, Solvents
22	Huber's Nursery – 2424 S. DuPont Highway N., Boyd's Corner	Nursery	Soil	Petroleum
23	Meyer Property – Pole Bridge Rd. East of SR 1, Biddles Corner	Current DELDOT Property	Soil	Petroleum
24	DELDOT ROW, Former Harvey Newton Texaco – DuPont Hwy at Port Penn Road	Former Gasoline Station	Soil	Petroleum
25	DELDOT ROW, Former M. Madic, Inc. – 2085 S. DuPont Parkway	Former Vehicle Repair Shop	Soil	Petroleum


Mt Pleasant
Meadowbrook Farms
Back Creek
Boyds Corner Rd
Old School House Rd
Post and Rail Farms
Wheatland
Spur
Spring
Chestnut Grove
Shallcross Lake
Mill Branch
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Bohemia Mill Rd
Armstrong Corner Rd
Match Line
Marl Pit Rd
Woodlawn Estates
Brick Mill Farm
Springmill
The Legends
Choptank Rd
Country Acres
Bunker Hill Rd
Middletown Village
Dove
Nest
Branch
Brick Mill Rd
Matapeake
Sandy
Branch
Middletown
N Broad St
Southridge
Main St
MARYLAND
DELAWARE
Middle Neck Rd
S Broad St
Silverlake Rd
Silver Lake
Noxontown Rd
Noxontown Pond
Church Rd
Norfolk Southern
Levels Rd
Wiggins Mill Rd
Strawberry La
Green Giant Rd
Warwick
Townsend
Grears Corner Rd
301
299
71
17
16
15
14
13A
13B
13C
12
11
10
9
8
P
G
B
Y
Project Area
Municipal Boundaries
Alternatives
Possible Contamination Sites
Source: DNREC, 2005
1 inch = .8 mile
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Potential Contamination Sites
Delaware Department of Transportation
November 2006
Figure III-11A

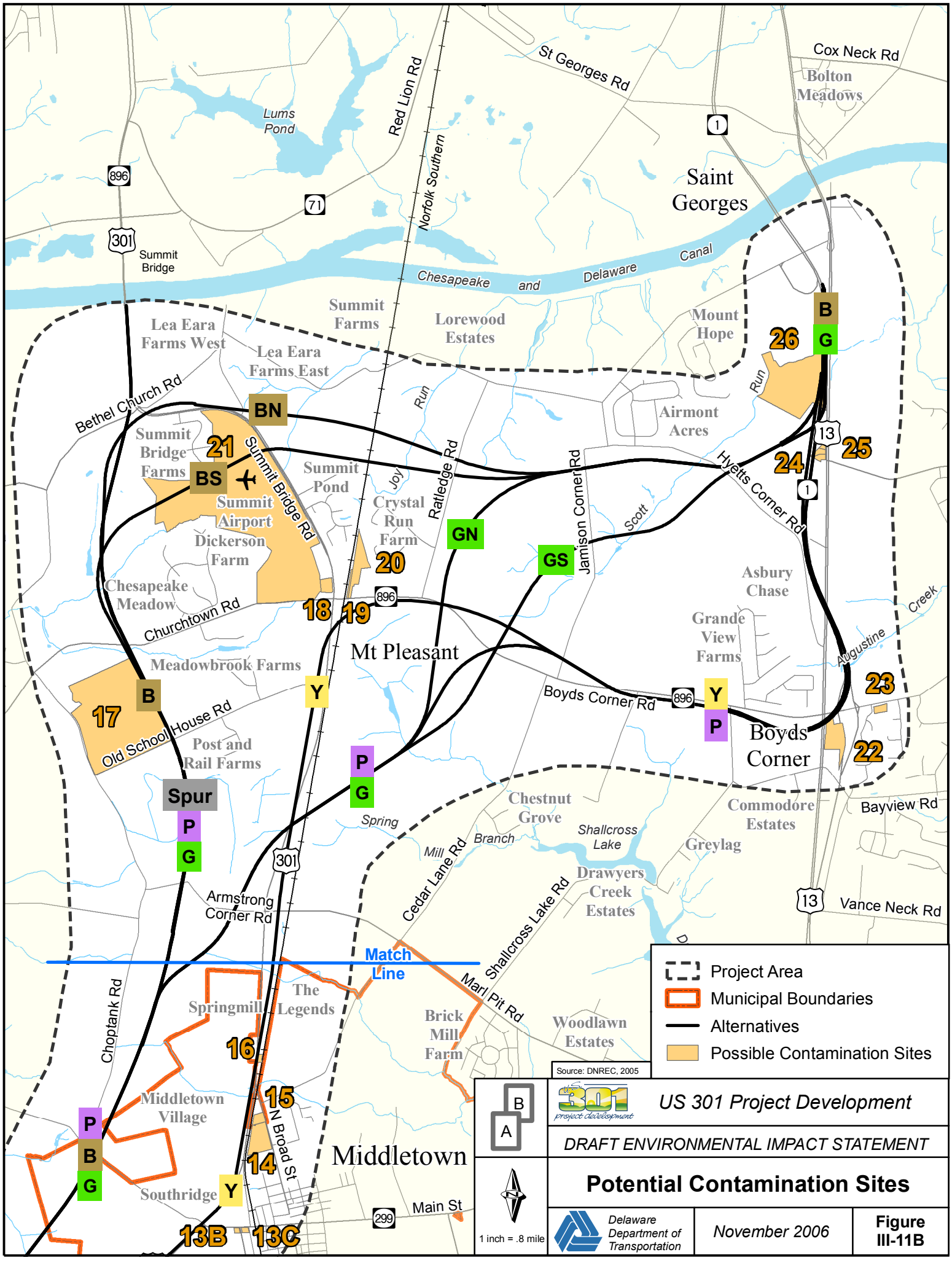

Saint Georges
Summit Bridge
Chesapeake and Delaware Canal
Lums Pond
Red Lion Rd
Norfolk Southern
St Georges Rd
Cox Neck Rd
Bolton Meadows
Mount Hope
Lea Eara Farms West
Lea Eara Farms East
Summit Farms
Lorewood Estates
Bethel Church Rd
Summit Bridge Farms
Summit Airport
Summit Bridge Rd
Summit Pond
Joy Run
Ratledge Rd
Crystal Run Farm
Dickerson Farm
Airmont Acres
Jamison Corner Rd
Hyetts Corner Rd
Scott Run
Asbury Chase
Grande View Farms
Augustine Creek
Chesapeake Meadow
Churchtown Rd
Mt Pleasant
Meadowbrook Farms
Old School House Rd
Post and Rail Farms
Boyds Corner Rd
Boyds Corner
Chestnut Grove
Commodore Estates
Bayview Rd
Spring Mill Branch
Shallcross Lake
Greylag
Cedar Lane Rd
Drawyers Creek Estates
Shallcross Lake Rd
Vance Neck Rd
Armstrong Corner Rd
Match Line
Marl Pit Rd
Brick Mill Farm
Woodlawn Estates
Springmill
The Legends
Choptank Rd
Middletown Village
Southridge
N Broad St
Middletown
Main St
BN
BS
GN
GS
B
G
Y
P
Spur
17
18
19
20
21
22
23
24
25
26
13B
13C
Project Area
Municipal Boundaries
Alternatives
Possible Contamination Sites
Source: DNREC, 2005
1 inch = .8 mile
US 301 Project Development
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Potential Contamination Sites
Delaware Department of Transportation
November 2006
Figure III-11B

Table III-41: DNREC Site Investigation and Restoration Sites

Site Map #	Site of Concern	Property Use	Potential Type of Contamination	Contaminant of Concern
3	Drake Auto Salvage Yard, 4195 DuPont Parkway, Townsend, DE 19734	Auto Salvage	Soil	None Confirmed. (No further action recommended)
5	Pine Tree Auto Salvage Yard, 352 Pine Tree Rd, Townsend, DE 19734	Auto Salvage	Soil	None Confirmed.
14	Johnson Controls Battery Group, Inc. 700 North Broad Street, Middletown	Battery Manufacturing Facility	Soil	Lead (RCRA) (No Further Action Required)
19	Sea Land Mt. Pleasant Facility – SR 896 at Norfolk Southern Railroad	Former Waste Oil Recycling Facility	Soil & Groundwater	Petroleum, PAHs, Toxic Metals – Former CERCLA, current SIRB site
20	Mt. Pleasant Railroad Dump – East of Norfolk Southern Railroad, North of SR 896	Debris Disposal Area	Soil	Rail Ties, Tires, Trash, Inert Debris
26	DELDOT Borrow Pit – West of SR 1/US 13, south of Scott Run	Borrow, Debris Disposal	Soil	Recycled Contaminated Soil

2. Environmental Consequences and Mitigation

Upon review of the DNREC regulatory database, a variety of properties with minor contamination problems are located in the project area. The proposed build alternatives cross several properties where limited areas of subsurface contamination may be present within the proposed right-of-way. ***Table III-42*** summarizes the results of the database search by build alternative.

Table III-42: Summary of Contaminated Sites by Build Alternative

Alternative	Contaminated Sites within Proposed Right-Of-Way	Additional Site Investigations Recommended
Yellow	4	4
Purple	3	3
Brown	1	1
Green	0	0

The Yellow and Purple Alternatives will cross properties with documented releases from petroleum USTs, including three current or former gasoline stations. The Brown Alternative will cross a property with documented releases of petroleum and paint solvents in localized areas. The subsurface contamination on these properties is likely of limited extent, but even minor levels of contamination will require appropriate management of contaminated materials if encountered during construction. The Green Alternatives will not cross any documented hazardous materials sites.

The most significant incidence of subsurface contamination within the project area is the Sea Land site, which is located along the Norfolk Southern right-of-way north of SR 896 and east of

US 301. The abandoned waste oil recycling facility at this site was the subject of an emergency cleanup by EPA in 1984. Residual contamination by petroleum products, polynuclear aromatic hydrocarbons (PAHs), creosote, and toxic metals remains beneath the soil cap. DNREC continues to require groundwater monitoring for PAHs and nickel in the drinking water aquifer.

Immediately north of the Sea Land site is the Mt. Pleasant Railroad Dump site, where Norfolk Southern cleaned up a debris dump under DNREC supervision. This site presents no significant risk of contamination for the proposed construction. A slight risk of contamination may result from other railroad activities within the Norfolk Southern right-of-way. Railcars are used for the transportation of many types of hazardous chemical products and waste materials. Soil and groundwater contamination has been documented along other rail corridors as a result of hazardous materials spills as well as small, incremental releases of fuel, lubricants, and cargo products.

The Johnson Controls Battery Group, Inc. property, located between US 301 and Broad Street in Middletown, was the site of RCRA corrective action administered by EPA and DNREC. In 1984, a rupture in the air pollution control baghouse released an estimated 75 pounds of lead and arsenic with resulting contamination of the facility roof and surface soils on-site and off-site. Subsequent remedial efforts included structure cleanup, soil removal, and risk assessment. EPA issued a Statement of Basis recommending no further action, dated July 2005. Considering the low level of off-site contamination, the site does not appear to present a significant risk of contamination to the proposed construction.

Although severe contamination is not anticipated, the proposed construction will need to accommodate appropriate management and disposal of contaminated soil or groundwater that may be encountered during construction. Only the Sea Land site, which is located within approximately 500 feet of portions of the Yellow Alternative, contains significant contamination levels. The documented contamination is unlikely to impact the proposed construction unless the proposed alignment is moved to cross over or very near the contaminated site.

Additional site investigation efforts are warranted at five sites before property acquisition. The level of investigation may range from review of regulatory documents to formal Phase I Environmental Site Assessments or Phase II Site Investigations, depending on site conditions and the likelihood of property purchase. Changes to the alternative alignments will change the need for site specific investigations.

The types of contaminants that may be encountered include petroleum contamination in soil and groundwater, toxic metals, PAHs, and volatile organic compounds (VOCs, typically solvents). These contaminants may occur both as soil contaminants and as dissolved groundwater contaminants. If the proposed construction encounters any of these contaminants of concern, appropriate excavation and disposal of contaminated materials in accordance with all applicable state and local regulations would be required.